

Spring 1984

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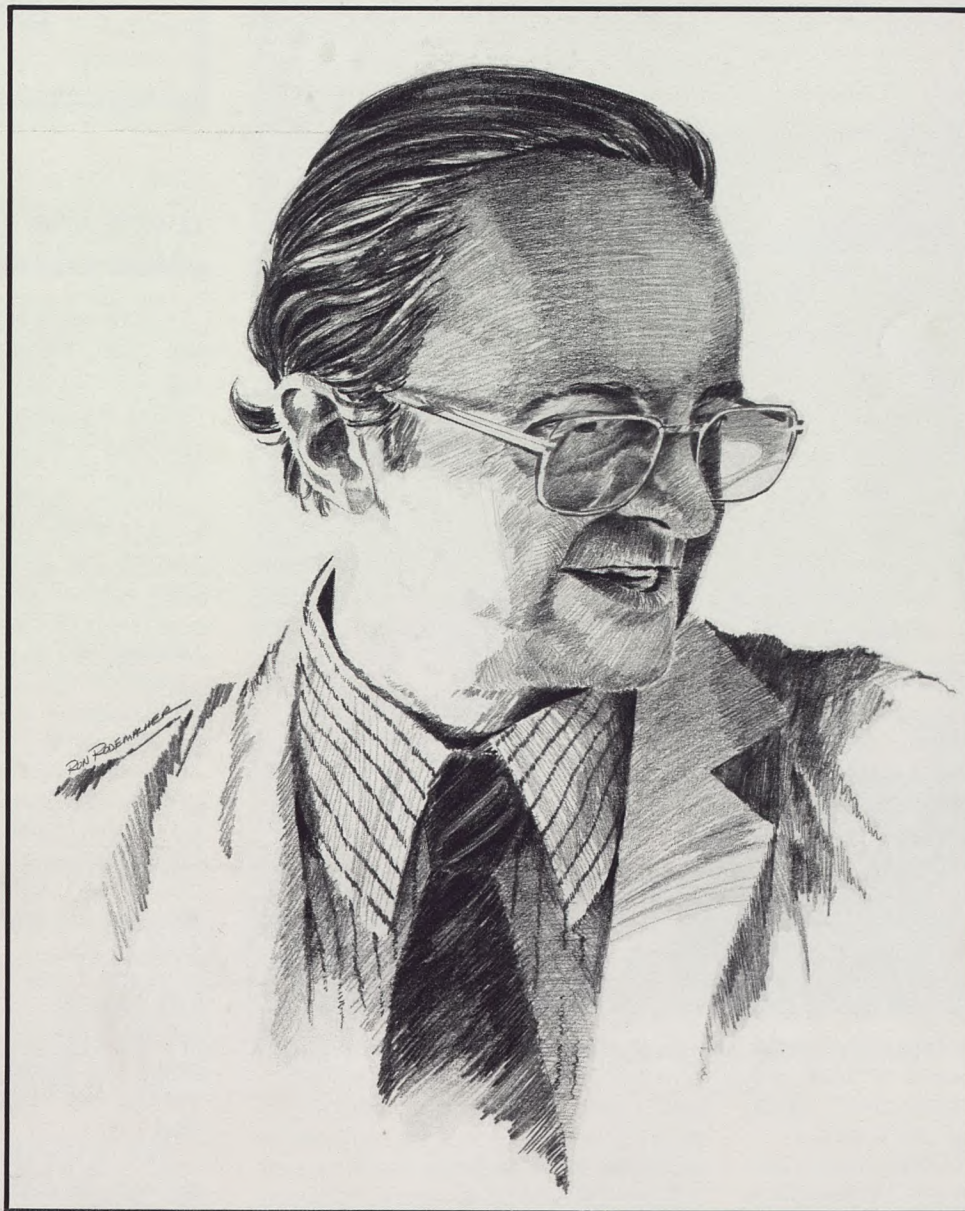
SPOT

M A G A Z I N E

Mallinckrodt Institute of Radiology

VOLUME XV
NUMBER 38

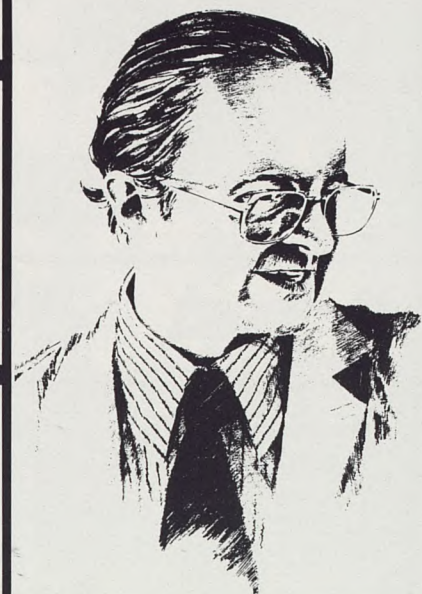
SPRING/SUMMER
1984



William H. McAlister, M.D.,
Chief, Pediatric Radiology

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Profile:



MALLINCKRODT INSTITUTE OF RADIOLOGY



Dr. McAlister greets 11-year-old Gordon Brigham at MIR entrance in Children's Hospital.

A new look for radiology's oldest subspecialty

A little girl's frightened cry pierces the quiet of the room and spills out into the corridor. Then, gradually, the sound softens and melts into the muted, comforting words of the team working with her.

Nearby, in the reading room, physicians study x-ray films silhouetted against the light panels, like detectives searching for clues.

Shiny, compact machines—placed strategically in the halls so that their operators will not be exposed to radiation—blink their red and green eyes as they relay electronic messages. Like silent spacemen, they monitor and communicate with the equipment inside the rooms, state-of-the-art machines equipped with massive muscle power and delicate touch as befit their unique and sophisticated diagnostic roles.

In the foyer, where parents wait with children, a young woman, her left leg amputated above the knee, grins and chats with a friend as she swings her crutches with practiced skill.

This is the Mallinckrodt Institute's section of pediatric radiology, the world of its chief, **Dr. William H. McAlister.**

William H. McAlister, M.D. Chief, Pediatric Radiology

by Mary Kimbrough

It's a world-within-a-world, one of the oldest subspecialties in radiology. It's a Lilliputian country peopled by the littlest patients, an ever-expanding diagnostic tool, a means to the ultimate end: healing.

The section, which since its modest inception at Mallinckrodt some 30 years ago has served Children's Hospital, was picked up bodily this spring and transplanted in the north end of the first floor of Children's Hospital where services could be expanded and patients could be cared for without moving them to another building.

The move doubled the section's size to 14,000 square feet with 10 examining rooms, office suites, and support facilities and with room to grow even more. Here are optimal radiology care for trauma and emergency room patients, imaging systems especially designed for children, portable x-ray equipment including fluoroscopy, and computerized monitoring of patient waiting time and film handling.

Its diagnostic services include ultrasound, nuclear medicine, computed tomography, and cardiac angiography.

Dr. McAlister, whose new office suite adjoins the examining rooms, really hadn't planned to enter this particular scientific world. In fact, as a boy, he had no thought of becoming a medical man. What he wanted to be was a music man.

Even before he finished high school in his native Highland Park, Michigan, he was an accomplished jazz trumpeter. But at a crossroads in his life, he packed away his trumpet and

his heady dreams of becoming a second Louis Armstrong and became instead a pre-med student at Wayne State University in Detroit.

After graduating first in his class at Wayne State University College of Medicine, with internship and residencies at Detroit Receiving and Cincinnati General, he came to Mallinckrodt as an instructor in radiology.

As he climbed the academic ladder to a full professorship eight years later, he gained renown as a leader in his specialty. He is a fellow in the American College of Radiology, former president of the Missouri State Radiologic Society and Greater St. Louis Society of Radiologists, American Board of Radiology examiner, and councillor of the St. Louis Metropolitan Medical Society. He has published more than 200 articles in scientific journals and in 1981 received the Society of Pediatric Radiology's Caffey Award, presented annually in honor of Dr. John Caffey, considered the "father of pediatric radiology."

But for all his acclaim, the one-time musician is not one to blow his own horn. Slender of build, mild of manner—although he is said by associates to be a captain who runs a tight ship—he talks of his life in a low key, without blast or blare.

He can laugh at his early dreams of showbiz and confess, with a wry smile, that as a consequence of his love of music and his heavy schedule playing music around Detroit, he "didn't do very well in high school."

But grades, to the youthful band

man, mattered little. He was reaching for the shiny ring of glory and, he hoped, gold.

"But one day a man named Nichols who had played with Benny Goodman told me it was a very tough life, very competitive, and I ought to do something else. I was just finishing high school and because of my poor record I had trouble getting into college. I decided I had to do something about that."

He did—but not by taking the easy way. Once accepted at Wayne State, he signed up for business administration. After the semester had begun, he switched to the even more demanding pre-med curriculum.

"I reasoned that pre-med would be more challenging and I could branch into any number of areas." He went from doing poorly in high school to an all A record in college.

His life had taken a 180-degree turn. Never again would he pick up the trumpet and play.

"That was the only way," he said. "It's like smoking. It's hard to smoke moderately. It is hard to play moderately."

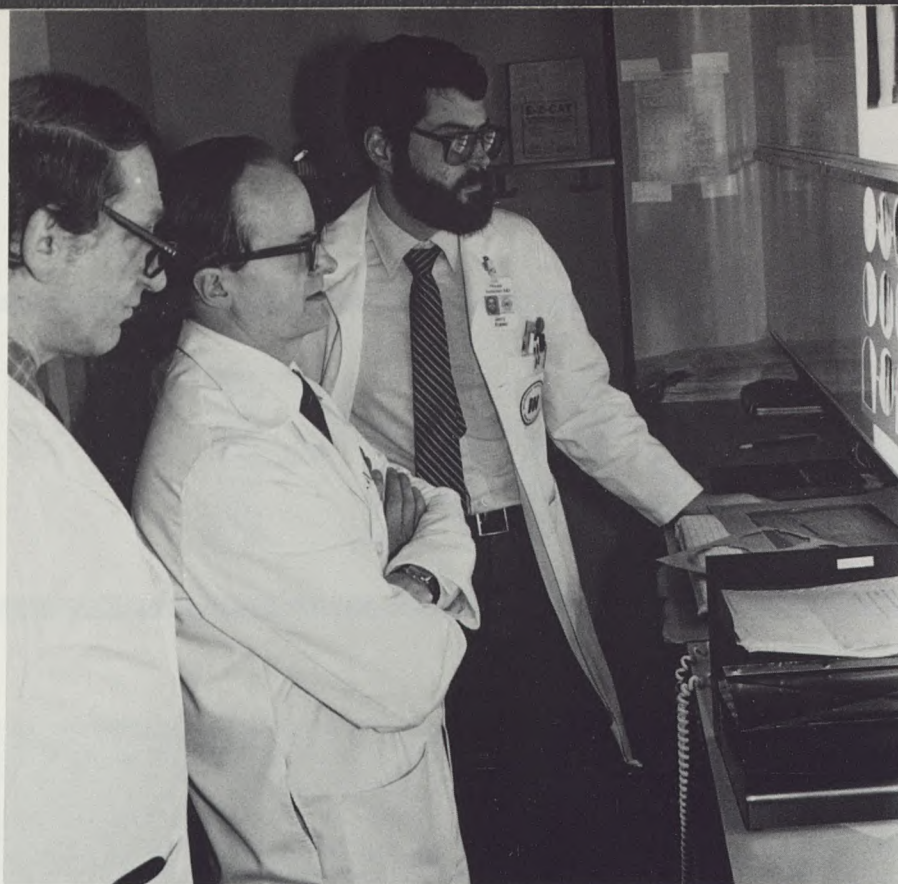
Smoking was no problem, he had never acquired the habit. But when it came time to give up the big band dreams, he quit cold turkey.

The sounds of music, however, could not be packed away so easily in a leather case. He still enjoys all kinds. Well, almost all kinds.

"I attend the Symphony some and the other night I accompanied our 13-year-old daughter to the Boy George concert.

"My wife and I flipped for it," he

Continued



Dr. McAlister reviews a patient's x-ray films with Dr. Jerry Tobler, left, and Phil Sotir, R.T.

explained with a grin. "I lost.

"The music is all right, I guess, but it is too loud. Even with earplugs, it's too loud."

To the music man turned medic, the sweetest sounds are to be heard in the noisy ebb and flow of the hospital's day and in the quieter hours of the hospital's night.

His first encounter with the medical world convinced him of this, although he didn't immediately focus on his ultimate specialty.

"I was planning to go into internal medicine," he recalled. "I thought maybe endocrinology. At Detroit Receiving Hospital there were required and elective intern rotations. I wasn't interested in radiology, but, frankly, the radiology elective seemed like a fairly easy rotation after some busy ones. During that month with Dr. Reynolds—prior editor of the American Journal of Roentgenology—I found the challenges of radiology captivating."

But, why pediatric radiology?

Dr. McAlister chuckled.

"That was because I was low man on the totem pole."

After completing his residency he was accepted on the staff by every one of the teaching hospitals to which he applied, including Massachusetts

General, Johns Hopkins, Peter Brent Brigham, and Stanford.

"Doctors Hugh Wilson, Alex Margulis, and Ted Hodges were the chief reasons I came to Mallinckrodt. I especially admired Dr. Wilson who along with Benjamin Felson and Juan Taveras were the finest radiologists with whom I have ever been associated."

Then, he added with a laugh, "Dr. Wilson offered me more money than anyone else."

He had understood he would divide his time among chest, GI, and angiography but when the pediatric radiologist left, he was tapped for the job and became the new pediatric radiologist. That was because he was the newest staff member—not because he was a pediatric specialist.

"I had two months of pediatric radiology training but strictly as an observer. As a resident, I dictated no pediatric films, did no procedures and could not ask questions while Dr. Silverman was reading films. Therefore, I took over a section never having performed a GI series, barium enema, or anything else on a child. The senior residents at MIR had more experience than I did in pediatric radiology. I am a survivor and did the best I could. It was real on the

job training. There is nothing like experience; patients are far better teachers than are textbooks or attendings. The pediatricians and staff at MIR including the residents were very supportive. I must point out the tremendous help given to me by **Phil Sotir**, the technical supervisor. That support along with Maalox saw me through the early days.

"Residents have changed little over the years. They still fall into fantastic, good, and not so good categories. The biggest difference is that there are more of them today. With increased number of imaging modalities—today's residents can serve patients better but seem less in command of the tools of his or her trade than the residents of ten or more years ago. Prior residents were more adept on conventional radiographic imaging and differential diagnosis. 'What is it' has been replaced by 'What other studies can we do?'"

He has never regretted becoming a pediatric radiologist. The small ones in his section's care are special to him.

But another difference, he added, sets pediatric radiology apart from its fellows.

"You have to be more sympathetic because in the case of a child you are actually dealing with more than one individual. You deal with parents, the grandparents or other adults who are advocates for the child."

Why does he enjoy particularly working with children?

He pondered the question only a moment.

"I think it is because of their potential. They have their whole life before them. Optimal diagnostic imaging and radiologic treatment play a profound role in patient management. It can be the key in a child's long and successful life."

Dr. McAlister and his wife, Victoria, have two daughters, Tory, 14, a student at Thomas Jefferson School, and 13-year-old DeDe, at John Burroughs.

"We are a close family," he said. "We do things together. Traveling and movies and, well, the Boy George concert."

"That wasn't one of the better things."

In his daughter's lifetime, he be-

lieves, medicine in general and radiology in particular will undergo marked changes, just as he has seen change in the span of his own career."

"Other than cranial computed tomography, changes in meaningful diagnoses are not as great as we would like to think. But we can arrive at diagnoses more quickly with less patient discomfort today. Imaging departments should move closer to the patients, just as we have done in this move to Children's Hospital. We need to be more efficient and offer a choice of imaging techniques in one area. Specialization based on imaging modalities in radiology is not in children's or radiology's best interests."

"Our profession has problems," Dr. McAlister said. "We must maintain the quality of imaging care to patients while decreasing costs. Radiologists must become involved to insure patients receive only meaningful imaging. Radiologists must be the ones to decide what imaging is

appropriate. With DRGs radiology has become an expense to the hospital rather than a revenue source. We will not have the luxury of doing all we desire in patient imaging."

"We are the only major country without socialized medicine and we too will be socialized unless physicians become involved. That is why I am active in the politics of health care."

"We must not permit new technology to be stifled. The consequences are too great."

But will that technology rob medicine of some of its humanity?

Again, his answer was quick and decisive.

"Only if the radiologists allow it to happen. Technology gives us a greater opportunity to serve people."

"But the bottom line has got to be concern for the patient."

If the patient happens to be one of Dr. McAlister's little people, that concern is liberally laced with love and laughter.

Mallinckrodt Institute of Radiology— Children's Hospital Partners in Health Care

On April 14, 1984, an historic day, after twenty-five years on MIR's fifth floor, pediatric radiology moved its entire operation to Children's Hospital's all new \$84 million facility.

Offering a complete imaging package—the use of all imaging modalities in the health care of children—pediatric radiology is headed by **Dr. William H. McAlister** and includes a staff of 22 employees. **Drs. Marilyn Siegel** and **Gary Shackelford** are full-time attending pediatric radiologists and **Phil Sotir, R.T.**, has served as technical supervisor since 1955. **Johnnie Moore, R.T.**, is assistant supervisor.

Phil Sotir, R.T., right, technical supervisor of pediatric radiology, explains the workings of a new cardiac catheterization unit to Donald O. Schnuck, a member of the Children's Hospital board of directors.

POST-DISPATCH PHOTO BY J. B. FORBES



Mallinckrodt Institute

*Where
costly
computers
save lives
and
money*



Dr. Gilbert Jost amidst mainframe computers in MIR's main computer room. Photo by Robert Boston.

Computers keep track of Master-Card purchases, control inventory, design buildings and help surgeons reconstruct people's faces. And locate elusive sources of infection in the body, determine the extent of strokes, and track patients and important medical records through a hospital.

At Mallinckrodt Institute of Radiology (MIR), computers, which often are thought of as cold, dehumanizing instruments of progress, are designed and used to benefit patients by improving patient care.

MIR, with 1983 revenues of \$25 million, performs 1,000 x-ray examinations a day, 350,000 examinations a year.

As part of Washington University Medical Center, MIR does not house patients; rather it provides a wide range of radiological services for the rest of the medical center including Barnes and Children's Hospitals.

The difficulty and the importance of keeping track of these vast quantities of vital information needed in several different locations prompted **Dr. Ronald Evens**, 44, director of the institute, to implement the extensive use of computers. Evens began developing an information base in 1971 when he was named head of the department of radiology at Washington University School of Medicine.

Eight main frame computers, made by Digital Equipment Corp., and approximately 150 remote terminals, (constituting an investment of about \$1.6 million in computer hardware) help track patients and patient information.

Diagnostic equipment, in which the institute has invested \$15 million, aids doctors in their ability to accurately and more quickly diagnose a variety of disorders.

Diagnostic equipment includes

machines that combine the best of modern medicine with sophisticated technology, such as the five \$1 million CT (computed tomography) scanners and the three \$900,000 PET (positron emission tomography) scanners, as well as more familiar machines like x-ray and ultrasound machines.

Evens says computers are involved with patient care from their "first scheduling to collection of money." While computers help the institute run efficiently as a business, "in our case, business has to be very personal," he says.

At the institute, a big part of being personal translates into minimizing waiting time and maximizing comfort for patients visiting the institute, and ensuring that patient records are readily available to physicians.

Dr. Gilbert Jost, 41, associate professor of radiology who is responsible for MIR's computer facilities,

says computers help "bring the operation under control and do things more efficiently, which translates into better patient care."

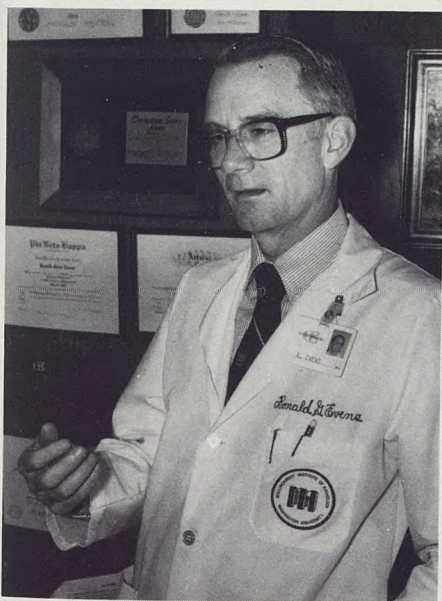
In a sense, computers precede patients and smooth the way for them in their interactions with MIR.

When patients check into Barnes, a computer at the hospital tells a computer at Mallinckrodt that an admission chest x-ray (and/or other physician requested x-rays) is required. In this way MIR can anticipate patient flow and schedule examinations so that patients are not kept waiting and facilities are utilized efficiently.

About 140,000 chest x-rays are taken each year at MIR and according to Evens and Jost, the time involved for the patient has been reduced, on average, to 20 to 30 minutes.

When patients arrive for their x-rays and later depart the institute, the respective times are entered on a computer.

Throughout the day, Evens uses a computer terminal in his office to monitor patient flow on each of the institute's 12 floors. The computer produces up to the minute graphs which illustrate how long patients spend on each floor, so that Evens can check to see that the types of examinations assigned to certain floors are not taking longer than they should.



Dr. Ronald G. Evens discusses the use of a computer terminal in his office to monitor patient flow throughout the institute. Photo by Robert Boston.

After examining the graphs, Evens can pinpoint potential problem-areas and investigate and attempt to remedy the situation immediately.

Tracking thousands of x-ray films through the medical center complex also has been streamlined with computers.

Each x-ray is placed in a jacket that is labeled with a bar code, just like the uniform product code on cans at the supermarket, which contains all pertinent patient information.

If an x-ray is removed from its proper location, for any reason, its destination and who has the x-ray is entered on the computer, so that the computer knows where x-rays are at all times. And that means that a surgeon in the operating room can locate a crucial x-ray in a matter of minutes.

Waiting for the results of x-ray examinations used to present problems for doctors who urgently needed the results in order to proceed with appropriate patient care. Evens has attempted to remedy this time problem through the use of MIR's seemingly ubiquitous computer system.

Doctors' lounges and patient floors have computer terminals that have access to radiologists' reports as soon as they are completed.

MIR has assumed a leadership position in the use of computers in radiology, says Evens. Jost concurs, pointing out that people at MIR developed most of the software for the institute's computers, since the kind of software they needed was not available from vendors.

MIR is unique, according to Evens. It is the only radiological institute that he knows of where the responsibility for both technical and professional operations rest in one place.

Evens is responsible for the 650 employees of the institute, 150 of whom have professional degrees, as well as for running the institute.

With 50,000 square feet and \$3.5 million a year devoted to research, and more than 150,000 square feet for x-ray examinations, MIR ranks as the largest radiological institute in the world.

Jost points out that while taken alone, individual tests may seem expensive, but the kind of efficiency that results from computers can reduce the cost of health care.

Computer technology used successfully in the defense and aero-

space industries is being applied to the medical world at MIR.

NMR (nuclear magnetic resonance) scanners use NASA's LANDSAT image processing computer to evaluate computer generated pictures of the body in the same way the satellite processes thousands of images of the earth and its terrain and then transmits them back to earth.

Doctors anticipate that NMR will have valuable application in diagnosing diseases of the central nervous system, such as multiple sclerosis, and in evaluating the condition of tumors after treatment.

McDonnell Douglas uses a CAD/CAM (computer aided design/manufacture) system to design aircraft. Dr. Michael Vannier's engineering background prompted him to use McDonnell Douglas' system and a CT scanner to reconstruct faces. Vannier, 35, is an assistant professor of radiology and former NASA engineer.

Reconstructive facial surgery is performed on children with congenital deformities, and on victims of trauma or of neck and facial cancer.

The CT scan is "used to understand the nature of the deformity and to plan a method of correction," says Vannier.

Vannier has modified a CT scanner so that it projects three-dimensional images of the skull onto a screen and then builds soft tissue over the skull, clearly depicting both the patient's underlying skull and physical appearance.

Information from the CT scanner is fed into the CAD/CAM system, which then draws a blueprint of the face. This enables the plastic surgeon to see the exact nature of the trauma or deformity—before surgery—and to build parts to implant in the face.

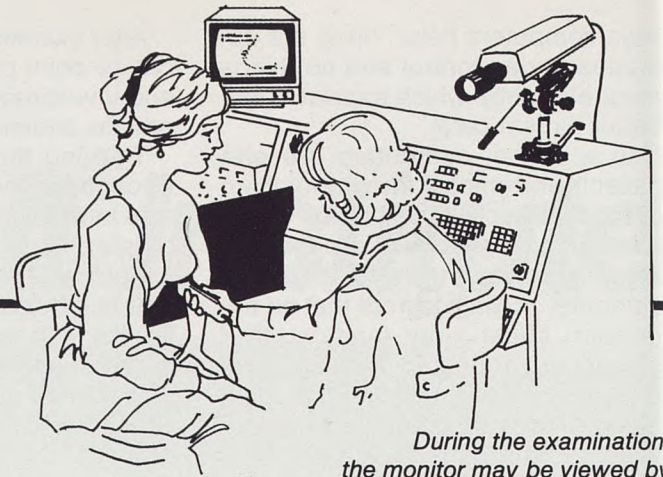
Teaming up with plastic surgeon Dr. Jeffrey Marsh, Vannier has performed about 500 examinations, and over 250 surgeries have resulted from these CT scan exams.

With the aid of this computer team, the surgery has become very precise and repeat surgeries are seldom needed.

This article by Lisa Urvater reprinted with permission from the St. Louis Business Journal.

Breast Cancer

MIR Evaluates Methods for Early Detection



During the examination, the monitor may be viewed by both the patient and technologist.

Breast cancer is the most common malignancy among American women, affecting one out of every eleven. Because of its pervasiveness, and the potential for tragedy that accompanies each individual case of the disease, it has become the subject of much public attention, as evidenced by the numerous magazine articles, radio programs, and television documentaries about it.

Perhaps more importantly, there has also been increasingly more scientific attention focused on it, as physicians and researchers attempt to find new and more effective means of diagnosing and treating it. The Mallinckrodt Institute is in the forefront of this work.

During the past 13 years, following the installation of the first mammography unit at the institute, Mallinckrodt clinicians have become highly skilled in interpreting mammogram results, which today average over 3,800 a year. With this clinical expertise, together with the institute's state-of-the-art mammography (patients receive 1/20th of the dosage they received a few years ago), more patients are being identified with early breast cancer (stages 0 and 1).

One hope for further reducing the breast cancer mortality rate is to increase the number of breast examination techniques. As part of this continuing effort, Mallinckrodt is currently clinically evaluating two promising new methods for imaging the breast—both potentially complementary to mammography. If they are effective diagnostic methods as Mallinckrodt physicians hope they will be, they could improve diagnostic accuracy and thereby reduce the

number of women who suffer the later stages of breast cancer.

Supported by a recent three-year \$300,000 grant from the National Institutes of Health (NIH), Mallinckrodt has begun evaluating nuclear magnetic resonance (MR) for the detection of breast cancer. In addition, the institute has also initiated a protocol study to evaluate lightscanning (computerized multi-spectral transillumination) as an adjunct diagnostic method.

The primary focus of these timely studies will be to compare each imaging method to mammography and then to determine what additional new diagnostic information it provides. **Drs. Robert Levitt and William A. Murphy** at MIR are participating in the NIH-supported research under principal investigation by John K. Gohagan, Ph.D., acting director of the division of health care research at Washington University. Two hundred women will receive MR examinations as part of this study. The lightscanning protocol study, directed by **Dr. Gerald A. Edelstein** in Mallinckrodt's 10 West outpatient facility, has already involved more than 500 patients.

Both MR and lightscanning offer capabilities for breast cancer detection that can enhance those already provided by mammography. While density and edge characteristics are not as distinct in MR imaging as in mammography, research has shown excellent discrimination between benign and malignant samples obtained in fatty and fibrofatty breast tissue for both invasive and noninvasive carcinoma. MR research will further define the distinctive MR

signatures for normal breast structures to establish the basis of comparison for abnormalities. The presence of breast malignancies not detected by mammography might be evident in MR scans; physicians may then turn to other methods for localization and definition.

Lightscanning offers particular capabilities appropriate for use as an adjunct to mammography. The procedure is based on the principal that normal breasts transmit light, while blood and tumors absorb light. The patient is seated in a dark room. With a small hand-held wand, the technologist gently beams alternating red and infrared light through the breast. The different patterns of light absorption, depending on the type of tissue, are fed into a computer and converted to color-coded images on the monitor, visible to both the technologist and patient. For example, the different colors in the blue, white, and red patchwork of a benign fibrocystic condition define the exact location of the cysts. Since breasts are basically symmetrical, and asymmetry could indicate a problem, the screen is split so that right and left breasts can be viewed side by side for comparison. The time required for a bilateral breast study is only 15 minutes.

Lightscanning produces particularly distinct images of the dense breast tissue characteristic of younger women, and since it is a harmless procedure, can complement mammography to monitor the breasts of young women for whom repeated tests are required. Since it does not use radiation, the technique can also be valuable for pregnant women.

MR Imaging of the Heart

Heart disease is the number one killer of Americans; more than half a million people succumb to it annually. Three times that number suffer heart attacks each year and while most attacks do not immediately result in death, they are extremely debilitating and many die from subsequent heart attacks.

Because of the severity of the problem of heart disease, physicians at Mallinckrodt are constantly searching for effective methods of diagnosing heart ailments and determining the extent of damage before the disease can cause death. A new diagnostic weapon in the fight against heart disease is now being evaluated.

Since the installation almost a year ago of the Magnetic Resonance (MR) unit at MIR, physicians at the institute have been using it for imaging of cardiovascular disease. The principal work is being done by **Drs. Robert G. Levitt**, associate professor of radiology, **Fernando Gutierrez**, assistant professor of radiology, **Harvey S. Glazer**, assistant professor of radiology, and **Edward M. Geltman**, assistant professor of radiology and medical director of the Cardiac Diagnostic Laboratory at Washington University Medical Center.

The MR research group has examined a broad spectrum of cardiac patients (more than 100) and focused on a number of clinical problems, evaluating congenital heart disease, hypertrophic and congestive cardiomyopathies, and ischemic heart disease. (Cardiomyopathy involves degeneration of heart muscle.) They have also studied normal cardiac structures.

And though the evaluation of MR imaging of the heart is still in its earliest stages, it seems that MR will have certain advantages over other diagnostic methods and will also prove to be valuable when used in combination with these other tests.

Because it is a noninvasive technique, MR has a safety advantage over cardiac catheterization. Although to this point, cardiac catheterization is the most accurate diagnostic test available, it has some risk involved with it. During the time Mallinckrodt physicians and researchers have tested MR, there have been no indi-

cations of any risk to the patient.

Dr. Levitt sees the possibility of using MR in combination with cardiac catheterization for some patients.

"The ability to obtain MR images in all three planes (sagittal, coronal, and axial) has proved useful in the evaluation of complicated congenital heart disease," said Dr. Levitt. "We have learned that MR images of the heart are a useful adjunct to the images obtained from cardiac catheterization. Specifically, MR images prove clinically useful in patients with a single ventricle, Ebstein's anomaly (Figure 1) and Marfan's syndrome (Figure 2)."

Compared with the echocardiogram, MR appears better in some respects but not in others. According to Dr. Gutierrez, "MR probably has an advantage over echocardiography in detailed imaging of the pericardium, because it allows differentiation between the layers of the pericardium as well as loculated fluid collections."

Dr. Geltman said, "I think MR is going to tell us some structural information better than echocardiography does due to the fact that there are some people on whom we can't get good echocardiograms because they are too fat or too skinny or their lungs are too much in the way—they've smoked too much. MR will be good for them. But, for the time being, MR is not going to be as good in seeing dynamic function of the heart. With an echo, we can watch the heart contract."

One potential problem with the use of MR for imaging the heart was avoided with the assistance of Siemens Corporation, who manufactured the MR unit at Mallinckrodt. Dr. Levitt explained, "Several minutes and hundreds of heart beats are required to obtain sufficient data to generate MR images of the heart and great vessels (aorta, pulmonary artery, and vena cava). The motion of the heart over the time period required to obtain this data would produce a blurred image. Therefore, an electrocardiographic triggering device which allows collection of data at a specific point in each cardiac cycle is required for diagnostic MR images. Fortunately, Siemens chose the institute to be the first MR installation to eval-

uate this EKG triggering device. This 'gating' procedure has resulted in dramatic diagnostic images of the heart and great vessels in a variety of cardiovascular diseases."

And what have the doctors been able to see in these dramatic images? "Much to our surprise, we are able to see the central coronary arteries in most of our patients," said Dr. Gutierrez. "More important, we believe we can determine the area of a heart attack, or myocardial infarction. This is evidenced by ventricular wall thinning, aneurysms of the ventricle, and the presence or absence of thrombus."

Dr. Levitt cited the usefulness of MR in investigating the degenerative diseases of the heart and hypertrophic and congestive cardiomyopathies. "MR imaging has been used with these patients to determine if the thickness of the left ventricular myocardial wall is too thick and whether or not there is normal blood flow within the left ventricle (Figure 3). These measurements have been correlated with PETT heart images of these same patients to determine any associations between structural and metabolic changes in the left ventricle in these conditions."

In the area of ischemic heart disease (a deficiency of blood supply to the heart muscle due to obstruction of the coronary arteries), MR imaging has been valuable in determining thinning of the myocardial wall, sluggish blood flow, mural thrombus, and aneurysm formation in patients who have had a heart attack.

"We have learned that all of these complications of myocardial infarction can be demonstrated by MR imaging (Figure 4)," Dr. Levitt said. "We have also found that the epicardial portions of the right and left coronary arteries, including their branches can be seen in MR images (Figure 5)."

"Our investigations to date have led us to believe that MR imaging of the heart and great vessels (Figure 6) is a promising technique for non-invasive imaging in cardiovascular disease," Dr. Levitt said.

Future developments may include imaging of nuclei besides hydrogen (such as sodium or phosphorus) to obtain data which may permit physicians to identify specific cardiovascular diseases.

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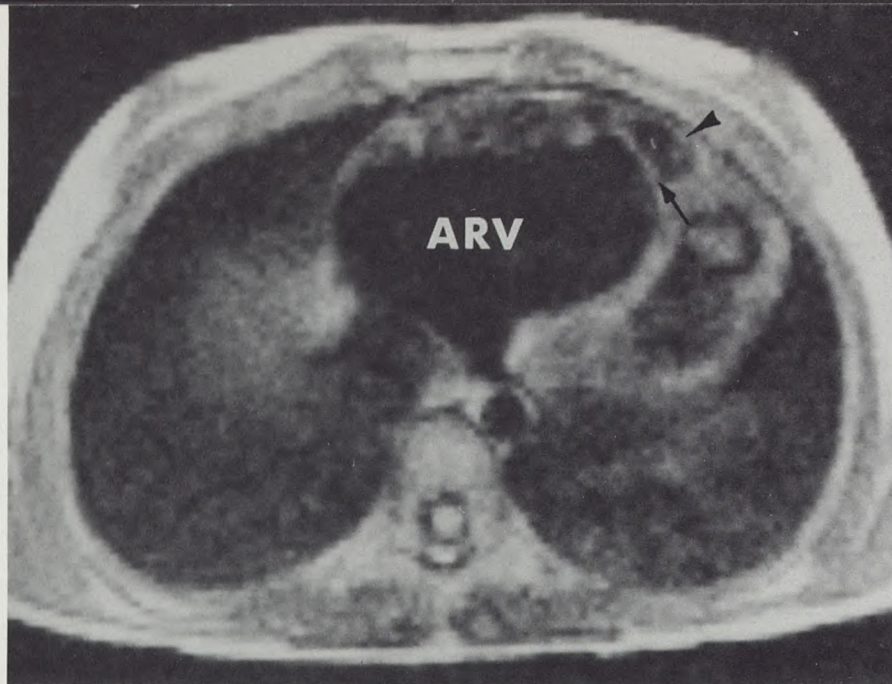


FIGURE 1

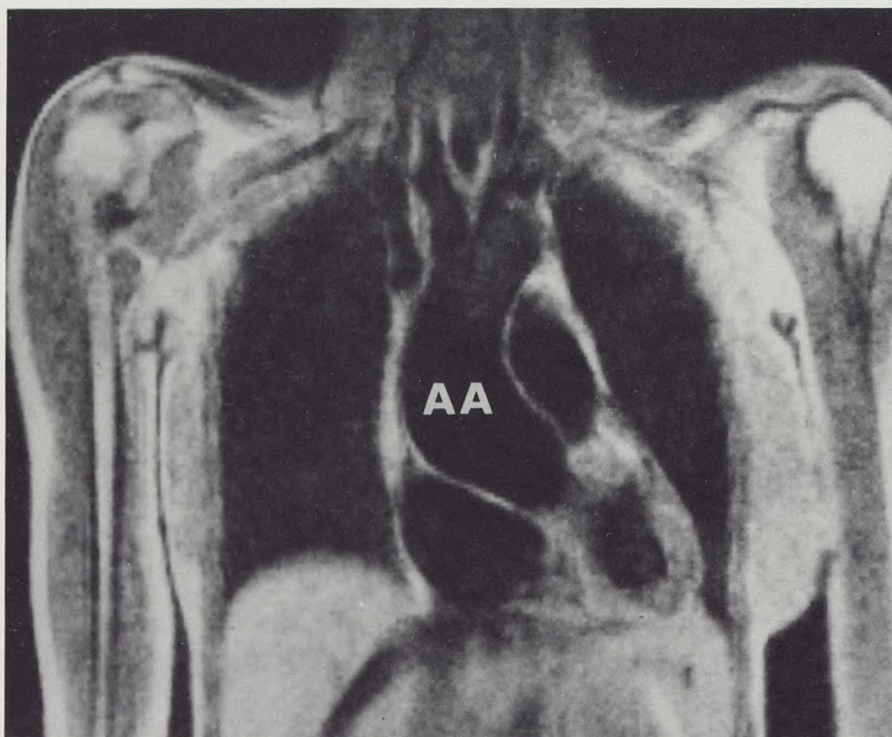


FIGURE 2A

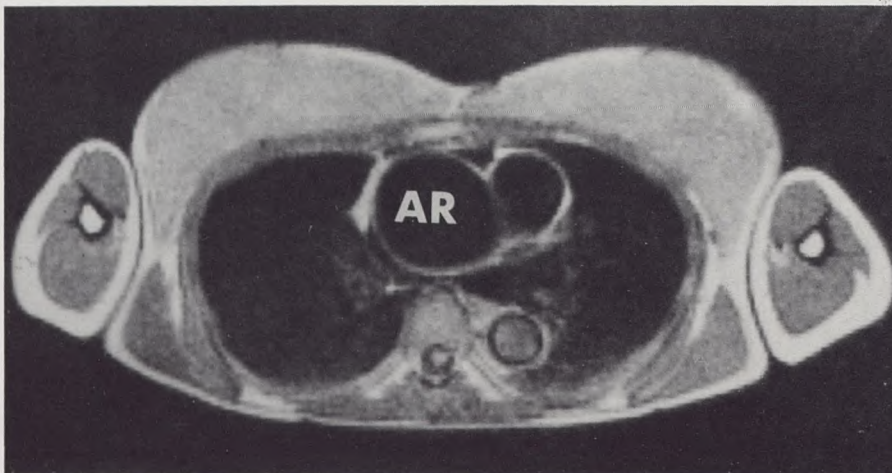


FIGURE 2B

Cardiac Imaging by MR

Figure 1: Ebstein's anomaly consists of downward displacement of tricuspid valve into right ventricle. Axial scan showing large "atrialized" right ventricle (ARV), small "functional" right ventricle (arrowhead), and displaced thickened tricuspid valve leaflet (arrow).

Figure 2: Marfan's syndrome is a hereditary disorder or connective tissue in the ocular, skeletal, and cardiovascular system. Connective tissue within the aortic wall degenerates which results in dilatation, aneurysm, and rupture.

A. Coronal scan showing dilatation of ascending aorta (AA) above the aortic root.

B. Axial scan showing dilated aortic root (AR) but no dissection.

Figure 3: Coronal scan showing thickened left ventricular wall (W) in hypertrophic cardiomyopathy. Pericardial effusion (arrowheads) surrounds heart.

Figure 4: Axial scan shows thinning of anterior wall (arrow) of left ventricle (LV) following myocardial infarction.

Figure 5: Axial scan in normal volunteer showing branches of left coronary artery (arrows) and right coronary artery (arrowhead).

Figure 6: Sagittal scan shows normal ascending aorta (A) and traumatic aneurysm (TA) of aortic arch.

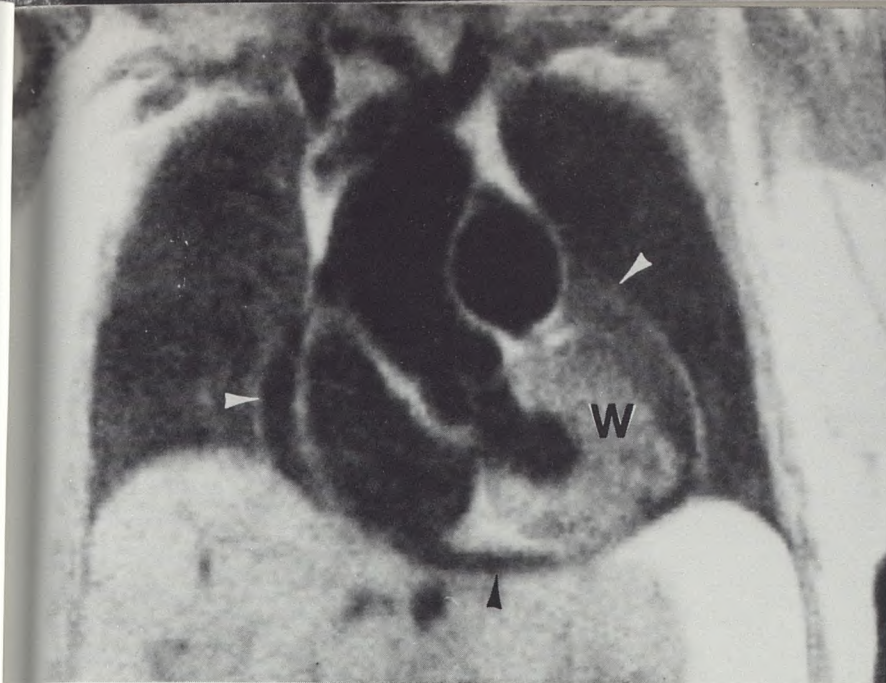


FIGURE 3



FIGURE 4

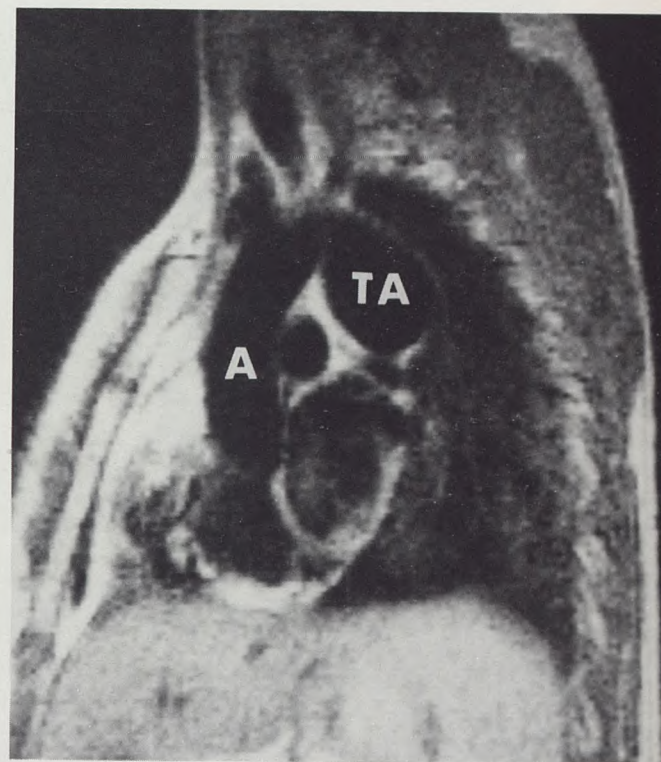


FIGURE 6

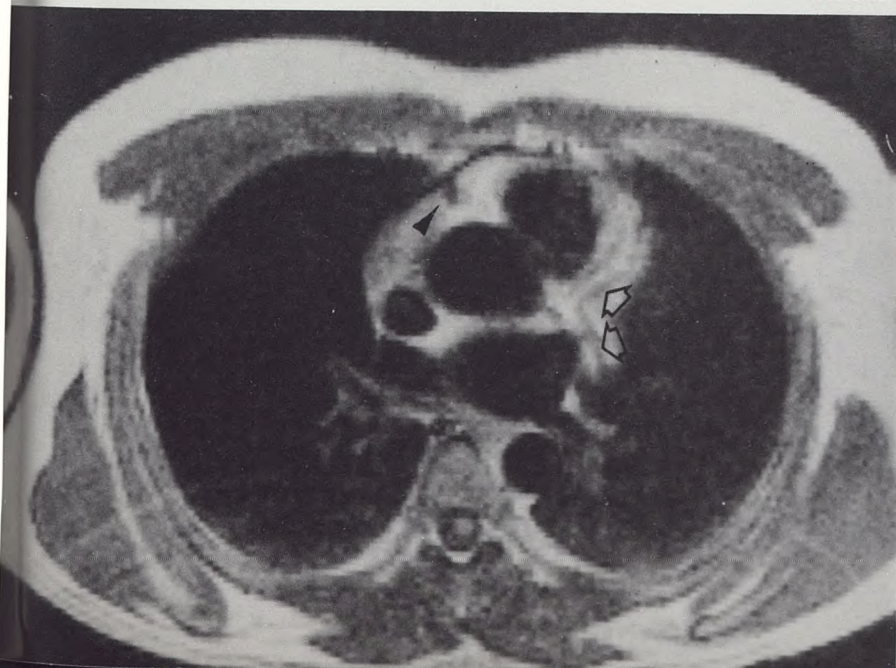
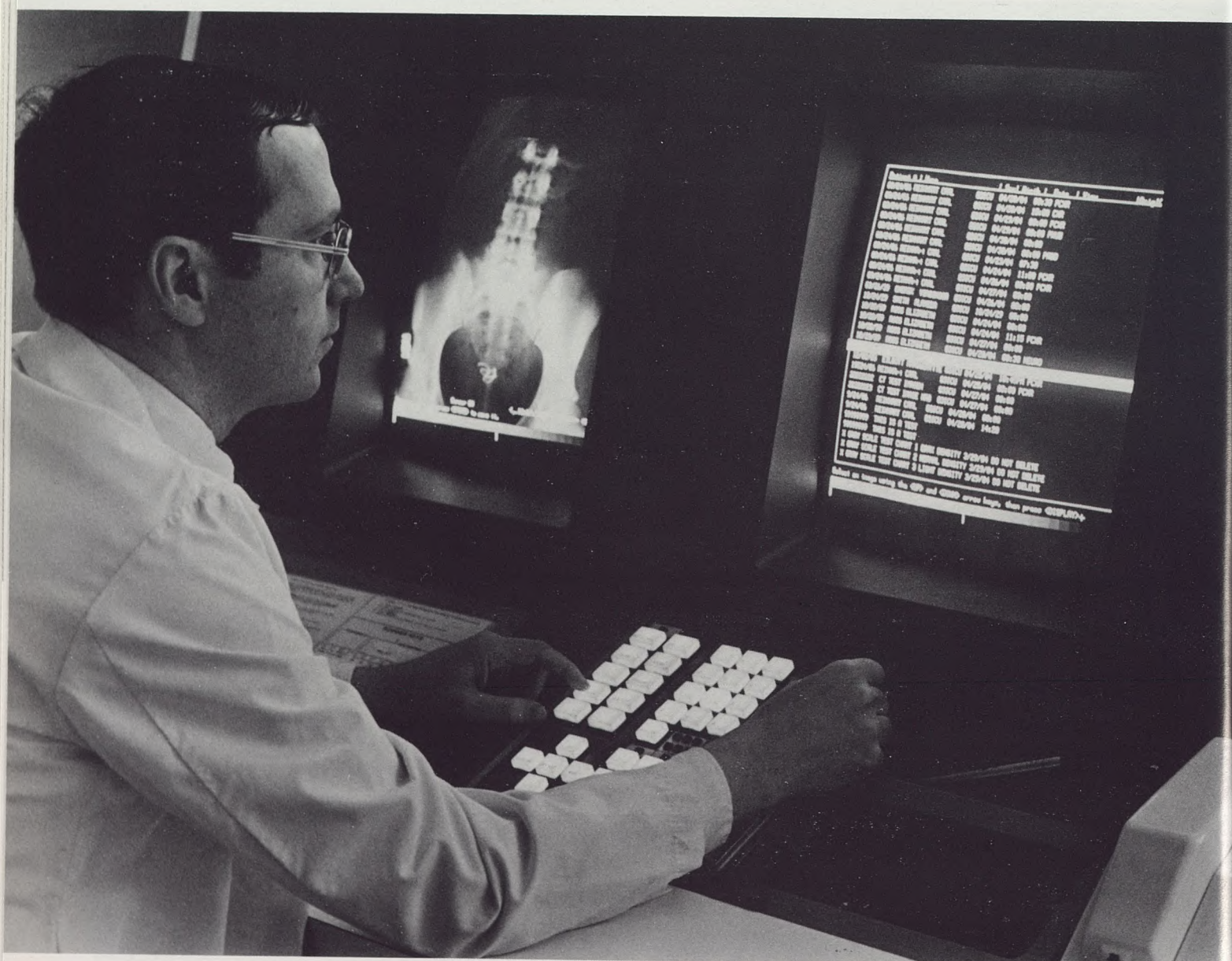


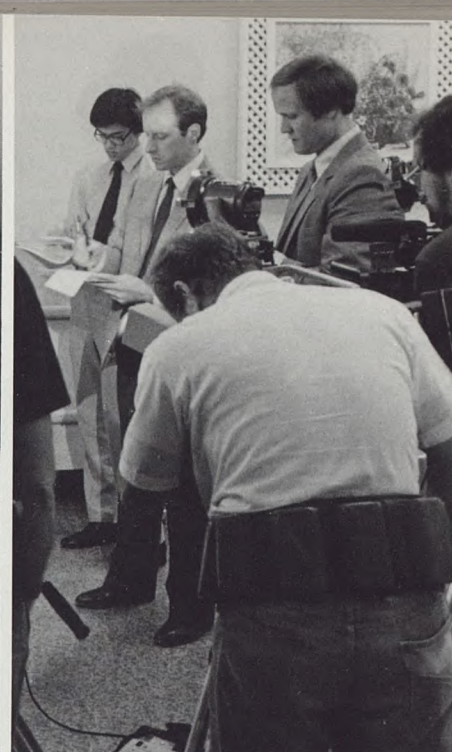
FIGURE 5

MIR NEWS CONFERENCE

MIR Unveils New Teleradiology System



Dr. Jost manipulates an x-ray image on the new teleradiology system now being used at Mallinckrodt Institute. The image can be enlarged, focused on a specific area, or adjusted for greater contrast.



On May 25, **Gilbert Jost, M.D.**, associate professor of radiology at Mallinckrodt, demonstrated to representatives of the St. Louis media a new teleradiology system that allows doctors to send and receive x-rays and other diagnostic images—electronically—from across the country or from one part of the medical center to another. Created by Raytel Medical Imaging, Inc. of California, the system enables physicians to have almost instantaneous access to a patient's x-rays—a major benefit in the case of a critically ill or injured patient.

The system's high speed scanner works somewhat like a copying machine. Scanning an x-ray in one-seventh of a second, it digitizes the image by transforming the x-ray's thousands of picture elements into representative numbers, based upon

how much or how little light exists in each individual element. The film images are then compressed and stored on computer disks for display immediately or later. With one million picture elements in each image, a disk could be filled in just a few hours at MIR, where approximately 1,000 x-rays are taken each day. Raytel data's compressed form enables a disk to hold 20 to 30 times more images.

During the news conference, the long distance capability was demonstrated when a digitized image of the bones in the hands was transmitted from Raytel in California via the system's telephone lines to Mallinckrodt and displayed on the unit's viewing screen, all within 40 to 80 seconds.

"The value of this feature," says

Dr. Jost, "is that as other medical centers install teleradiology systems, hospitals with the equipment will be able to call on the diagnostic skills of Mallinckrodt's radiologists for consultation by providing them with patient images for viewing only seconds after they have been taken."

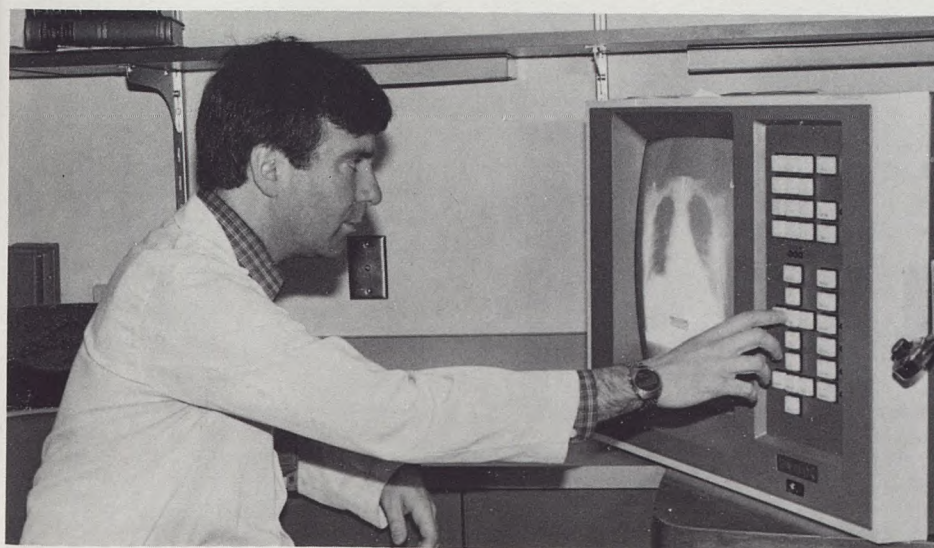
Speed of access to x-rays is seen by MIR physicians as a major asset of the system. "Today, it takes from two to thirty minutes for an x-ray to be dispatched from radiology to another department within the hospital," says Dr. Jost. "By eliminating the need to physically transfer the film, valuable time can be saved."

Another advantage to the system is that, since an image can be transmitted to a number of monitors—simultaneously—several physicians can consult by telephone rather than having to gather in a central viewing area.

"The ability to manipulate the image is also greater than with conventional x-ray film," says Dr. Jost. "With a viewer's controls, the radiologist or attending physician can gain additional information by enlarging the image, focusing on a specific area, or by adjusting the amount of light for greater contrast."

MIR's staff is also investigating potential uses of the Raytel system, such as the system's ability to communicate with computed tomography, ultrasound, magnetic resonance, and other digital imaging systems. Enlargements to the system may eventually allow it to become a cost effective link by eliminating the need

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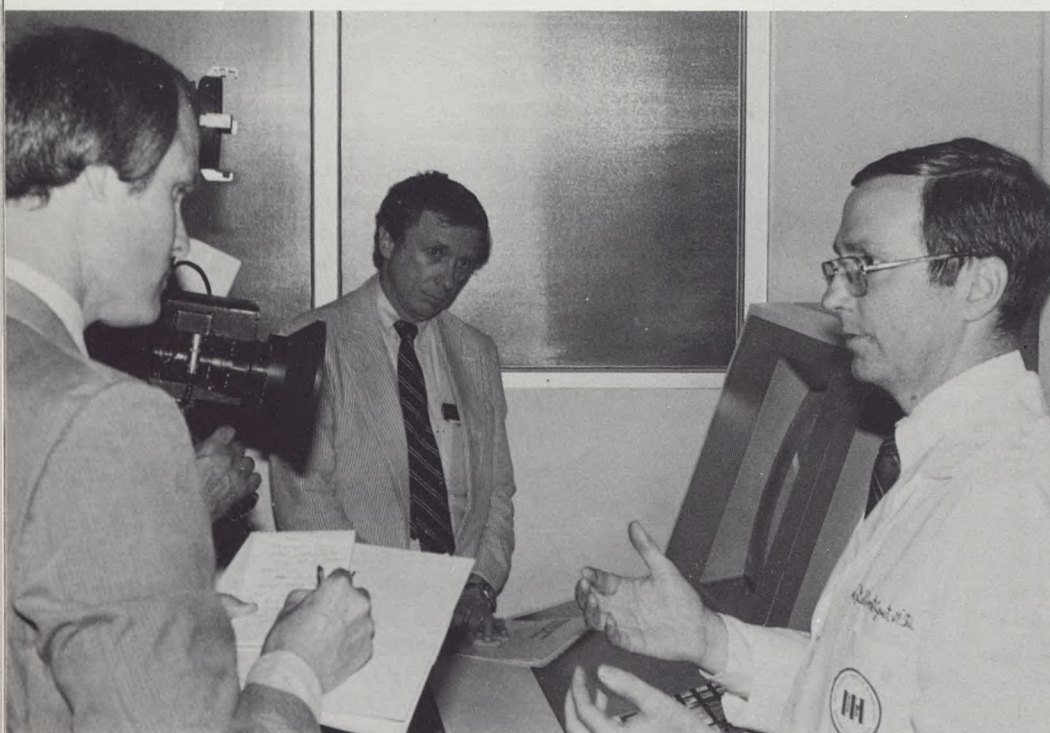


Physician reviews x-ray in Barnes Hospital RICU.

MIR News Conference



Gilbert Jost, M.D., discusses new teleradiology system at Mallinckrodt and demonstrates its capabilities at St. Louis news conference.



for costly investments in film and storage space.

"This is particularly significant for large institutions," says director **Ronald G. Evens, M.D.** "At present, Mallinckrodt Institute devotes more than 15,000 square feet of space (at \$10 per square foot) to store x-rays. We spend \$4 million annually for x-ray film."

The system became fully operational in early 1984 and consists of a central image storage unit, located on the second floor of the institute adjacent to the film reading area and two remote viewing monitors, installed in the Barnes Hospital Respiratory Intensive Care Unit and Emergency Room.

"The whole issue of digital imaging, transmission, and display is an area of intense investigation at MIR," says Dr. Jost. "We are exploring several projects in this field."

ACR Computer Conference

R. Gilbert Jost, M.D., associate professor of radiology, coordinated a major ACR Conference on Computer Applications in Radiology held May 23-25 in St. Louis. Attended by over 250 radiologists, computer scientists, radiology technologists, and business managers and administrators, the forum explored such topics as patient information, image management, billing systems, microcomputers, and personal computers. **Dr. Ronald Evens** spoke on computer management techniques for diagnostic radiologic practice with special emphasis on DRGs.

The forum concluded with a tour of Mallinckrodt Institute's radiology computer facility, the largest in the world.

Dr. Siegel Appointed to State Committee

Barry A. Siegel, M.D., professor of medicine and radiology and director of the division of nuclear medicine at Mallinckrodt Institute of Radiology, has recently been named to the Missouri Low-Level Radioactive Waste Advisory Committee by Governor Christopher S. Bond. Dr. Siegel was appointed as the representative of the medical field to the committee and will serve a two-year term.

The committee, which also has members representing industry, higher education, the general public, as well as the Missouri House and Senate, was created in October 1983 by the state legislature when Missouri joined the Midwest Interstate Low-Level Radioactive Waste Compact. Through the compact, Missouri will cooperate with other midwestern states toward solving the problems of the disposal and storage of low-level radioactive waste generated by industry, nuclear power plants, manufacturers of radiopharmaceuticals, and medical institutions. According to the terms of the compact, a commission has been established to direct the cooperative effort and will have as members one representative of each of the participating states. Dr. Siegel and the others on the committee will act in an advisory capacity to Missouri's representative on the compact commission.

Widely known for his contributions to the growth of nuclear medicine as a specialty, Dr. Siegel has been an active spokesman for the past four years on the importance of safe and economical storage of low-level radioactive waste.

In his testimony on the subject before the state legislature in 1982, he said, "The continued ability to provide essential nuclear medicine services for the immediate benefit of thousands of patients annually as well as the future gains to society derived from biomedical research are highly dependent on the con-



Barry A. Siegel, M.D.

tinued capacity to dispose of these low-level radioactive wastes." Many of medicine's most accurate and reliable diagnostic techniques require the use of radioactive materials.

Dr. Siegel received his undergraduate and medical education as well as his residency training in diagnostic radiology and nuclear medicine at Washington University. He was appointed director of the Mallinckrodt division of nuclear medicine in 1973. Dr. Siegel is a member of the board of trustees of the Society of Nuclear Medicine, a fellow in the American College of Radiology and the American College of Nuclear Physicians, and chairman of the Radiopharmaceutical Drugs Advisory Committee of the Food and Drug Administration (FDA).

Another MIR First

A new twenty-three inch image intensifier, the largest in the world, has just been installed in the outpatient area of Mallinckrodt Institute. This is the only unit in the country capable of performing both supine as well as upright examinations.

In the system, radiation passing through the patient strikes a photoconductor to produce a direct electric signal, which is amplified and then projected onto a viewing screen.

Because of its unusually large size, the image intensifier can perform examinations with a large field of view such as chest and abdomen studies. The films that are produced are small, less than 4 inches x 4 inches.

Dr. Stuart S. Sagel, professor of radiology and chief of MIR's chest imaging section, and **Dr. Gilbert Jost**, associate professor of radiology in MIR's chest and computer sections, will direct the evaluation of this new device in a wide variety of radiographic applications. Advantages of the system include a significant reduction in radiation exposure as well as a savings in film cost. The unit will later be evaluated as part of the institute's program to develop technology for the digital storage and display of radiographic images.

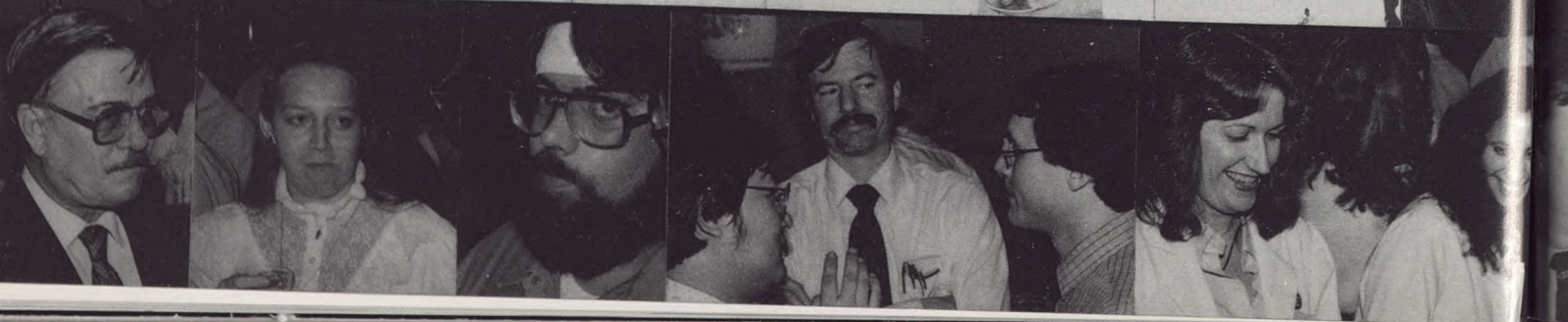
MIR building two new PETT devices: one for clinical purposes

Mallinckrodt Institute of Radiology—for nearly two decades a leader in innovations in PETT (positron emission transaxial tomography) imaging—is presently building two new PETT devices. One of these, dubbed by **Dr. Michel M. Ter-Pogossian** (the "father" of PETT) as Super PETT B (for body imaging) will be applied to clinical nuclear medicine. The first such application of PETT anywhere in the world, this unit will also be used for research by **Dr. Barry Siegel** and the staff of the division of nuclear medicine. The second unit, Super PETT H (for head imaging) will be used exclusively for research by the institute's neurological group under

the direction of **Dr. Marcus Raichle**.

"Both of these units are more advanced than anything which exists now," says Dr. Ter-Pogossian, director of the division of radiation sciences. "Super PETT is a fast system that provides high resolution. It is also a time-of-flight system and is an advanced version of Super PETT I located in the Barnes Coronary Care Unit. Super PETT B is similar in design to Super PETT H, except that it has a larger aperture and field of view."

Dr. Ter-Pogossian expects the first unit to be completed by the end of 1984 and the second in the spring of 1985.





MIR CHRISTMAS PARTY, 1983







NEWS

ARRS

The following Mallinckrodt staff members participated in the annual meeting of the Roentgen Ray Society, April 8-13, in Las Vegas, Nevada.

SCIENTIFIC PROGRAM

"CT of Colonic Diverticulitis and Its Implications," **Jerrold A. Van Dyke, M.D., Dennis M. Balfe, M.D., and Joseph K.T. Lee, M.D.**

"Ultrasonographic Evaluation of the Rotator Cuff," **William D. Middleton, M.D., Gerald Edelstein, M.D., William Reinus, M.D., G. Leland Melson, M.D., and William A. Murphy, M.D.**

"Roentgen and the Early Years—a Backward Glance As We Approach Our 10th Decade," **David J. DiSantis, M.D., and Ronald G. Evens, M.D.**

"Utilization Characteristics of a Siemens Superconductive NMR System (Magnetom) Undergoing Initial Clinical Trial," **William A. Murphy, M.D., Mokhtar Gado, M.D., Robert G. Levitt, M.D., Joseph K.T. Lee, M.D., William G. Totty, M.D., and Ronald G. Evens, M.D.**

"CT of the Opacified Hemithorax," **Ralph L. Smathers, M.D., Gary A. Press, M.D., Harvey S. Glazer, M.D., Stuart S. Sagel, M.D.**

"¹H-NMR Imaging of Superior Mediastinal and Hilar Masses: Comparison with CT," **Robert G. Levitt, M.D., Harvey S. Glazer, M.D., Stuart S. Sagel, M.D., Dixie J. Aronberg, M.D., R. Gilbert Jost, M.D., Joseph K.T. Lee, M.D., William A. Murphy, M.D.**

"Melanoma: CT Patterns of Spread," **James B. Weinstein, M.D., David J. DiSantis, M.D., Joseph K.T. Lee, M.D., Harvey S. Glazer, M.D., Robert G. Levitt, M.D.**

"Nuclear Magnetic Resonance (NMR) of Abdominal Aortic Aneurysms," **Joseph K.T. Lee, M.D., David Ling, M.D., Jay P. Heiken, M.D., Robert G. Levitt, M.D., William A. Murphy, M.D., G. Leland Melson, M.D.**

"CT of the Gallbladder: Inflammatory vs. Malignant," **Ralph L. Smathers, M.D., Joseph K.T. Lee, M.D., and Jay P. Heiken, M.D.**

"Papillary Renal Cell Carcinoma—CT and Ultrasound Evaluation," **Gary Press, M.D., Bruce L. McClenan, M.D., G. Leland Melson, M.D., Philip J. Weyman, M.D., Joseph K.T. Lee, M.D., Matthew A. Mauro, M.D.**

"NMR of Femoral Head Ischemic Necrosis," **William A. Murphy, M.D., William G. Totty, M.D., Wayne J. Daum, M.D., Robert G. Levitt, M.D., and Joseph K.T. Lee, M.D.**

"Digital Vascular Imaging in Transhepatic Sclerosis of Esophageal Varices," **Philip J. Weyman, M.D., Michael W. Vannier, M.D., and Bruce L. McClenan, M.D.**

EXHIBITS

"High Resolution CT of the Porta Hepatis: Normal and Pathologic Anatomy," **James B. Weinstein, M.D., David J. DiSantis, M.D., Dennis M. Balfe, M.D., Joseph K.T. Lee, M.D., Jay P. Heiken, M.D., and Philip J. Weyman, M.D.**

"Digital Coronary Arteriography," **J. P. Neeley, M.D., M. W. Vannier, M.D., and F. R. Gutierrez, M.D.**

INSTRUCTIONAL COURSES

"CT of the Mediastinum" for the Categorical Course on Computed Body Tomography, **Stuart S. Sagel, M.D.**

"Neuro and Abdominal NMR," **Ronald G. Evens, M.D., William A. Murphy, M.D., Joseph K.T. Lee, M.D., and Mokhtar Gado, M.D.**

AWARDS

Drs. James B. Weinstein, Jay P. Heiken, Joseph K.T. Lee, Dennis M. Balfe, Philip J. Weyman, and Roy R. Peterson, Ph.D., received the Roentgen Ray Society Bronze Medal for their exhibit, "High Resolution CT of the Porta Hepatis and Hepatoduodenal Ligament." Presently on display in the MIR lobby, the exhibit illustrates the area where the portal structures pass from the liver through the hepatoduodenal ligament (HDL) to the small intestine. The area's complexity and lack of fat have made it difficult to identify in detail with CT. In the exhibit, CT scan "slices" and photographs of corresponding specimen slices taken from two cadavers provide a basis for identifying the normal anatomy of this complex area. Others at Mallinckrodt who provided assistance were **Janelle Sabo and Susan Fisher**, technological, with CT scans; **Norman Hente and Tom Murry**, photography; and **Sue Day, Patty Haring, and Lynn Losse**, secretarial.

Chief Residents in Diagnostic Radiology

Daniel D. Picus, M.D., has been named chief resident and **William D. Middleton, M.D.,** co-chief resident for 1984-85. They will be working closely with **Dr. Ronald Evens** and **Dr. Gary Shackelford** in the operation of the MIR diagnostic residency program.

Chief Residents in Radiation Oncology

The division of radiation oncology announces that **David Monyak, M.D.,** has been named chief resident for the 1984-85 academic year and **Perry Grigsby, M.D.,** has been named assistant chief resident.

UPDATE



Award Winning Exhibit

Elected

Barry A. Siegel, M.D., has been elected a member of the Academic Freedom and Tenure committee by the Washington University Medical School faculty for a three-year term beginning July 1, 1984.

Virginia R. Trent, MIR director of public relations, has been elected to the board of governors of the Advertising Club of Greater St. Louis for a three-year term. Of twelve members selected as candidates for the board, Mrs. Trent was one of the six candidates receiving the largest number of votes. The 1,000-member Advertising Club of Greater St. Louis, a leading civic organization in metropolitan St. Louis, is the oldest and one of the largest advertising organizations in the country.

Bruce L. McClennan, M.D., has been elected secretary-treasurer of the Greater St. Louis Society of Radiologists. The largest local radiologic society in Missouri, it is part of the Missouri State Radiologic Society and serves as the local chapter of ACR. Other new officers for 1984-85 are MIR alumni Richard Graviss, M.D. ('74), president and Gene Davis, M.D. ('76), vice president.

Chairman

Michael W. Vannier, M.D., served as chairman of the technical session, Innovative Technology Applications, for the Twenty-first Space Congress, Cocoa Beach, Florida, April 24-26.

ACR Conference on CT Scanning Radiation

Ronald G. Evens, M.D. chaired the ad hoc planning committee for an ACR conference on computed tomography scanning radiation dose in Washington, D.C., June 6-8. Funded by a grant from the Food and Drug Administration, the conference included a multi-disciplined faculty of physicians, physicists, and other radiation specialists who discussed CT exposure from their perspectives, defined problem areas, and recommended possible changes in usage patterns. Dr. Evens discussed CT utilization and **Dr. Michel M. Ter-Pogossian** provided an overview of CT equipment.

Honored

Carlos A. Perez, M.D., director of the MIR division of radiation oncology, has been listed in **The Best Medical Specialists in the U.S.**, a guide to the best doctors and medical services in the country produced by *Town and Country* magazine. Author John Pekkanen queried more than 300 physicians by phone, personal interview, and questionnaire in order to create the directory listings. Dr. Perez is among 26 radiation oncologists from across the country judged by their peers to be superior physicians. "What was sought was not simply a physician's research reputation, but his skills as a clinical doctor," states Pekkanen. "Certainly not every outstanding physician in this country is listed here. There are literally tens of thousands of them."

Awards

Sheri D. Henderson, Ph.D., was voted a member of the Outstanding Young Women of America for 1983.

Michael W. Vannier, M.D., has been selected to appear in the Marquis Who's Who Biographical Directory of the Computer Graphics Industry. This directory presents complete profiles of the education, career history, product expertise, and computer graphics application areas of professionals in the computer graphics industry.

Continued

NEWS

Awarded Grants

A three-year study of how the latest in medical technology can be used to detect the early stages of breast cancer has been funded at Mallinckrodt Institute of Radiology (MIR) and Washington University School of Medicine.

The \$309,547 grant from the National Institutes of Health will evaluate the use of MR (magnetic resonance) imaging in the detection of breast cancer. Two hundred women will receive MR examinations as part of the study.

MR imaging uses short wave radio signals and sophisticated computer technology to determine the appearance and makeup of body tissue and structures.

Dr. John Gohagan, associate professor of preventive medicine and of engineering and applied science, will collaborate on the project with **Dr. Robert G. Levitt**, associate professor of radiology, who will be the primary MR image interpreter, and **Dr. William A. Murphy**, professor of radiology.

It is anticipated that this timely study will demonstrate that MR aids doctors' ability to detect breast cancer in its early stages and will determine what additional diagnostic information MR will provide to complement that provided by mammography.

Breast cancer strikes more than 112,000 women annually in the United States.

Hsiu-san Lin, Ph.D., associate professor of radiology and assistant professor of microbiology and immunology, has received a five-year grant of \$418,209 from the National Institute of Allergy and Infectious Diseases, National Institutes of Health (NIH), for a study of "Origin and Differentiation of Monocytes." The objective of the investigation is to isolate and define the progenitor cells of monocytes present in bone marrow. He will develop monoclonal antibodies for a macrophage-specific growth factor as well as for various classes of mononuclear phagocytes.

Barry A. Siegel, M.D., professor of medicine and radiology, and **Michael Welch, Ph.D.**, professor of radiology, are collaborating on a five-year research grant from the National Institutes of Health to develop a radionuclide scan to detect early spread of prostate cancer. Principal investigator is Dov Kadmon, M.D., assistant professor of urology at Washington University School of Medicine.

Workshop

Michael W. Vannier, M.D., with Jeffrey L. Marsh, M.D., plastic surgeon at Children's and Barnes Hospitals, and Don Gayou, McDonnell Douglas Aircraft Design Division, conducted a workshop on Medical Applications of CAD/CAM Technology for the first international meeting in computer-aided design applied to medicine. The workshop, sponsored by the Canadian Department of Commerce and Development and the New Brunswick Manufacturing Technology Centre, was held in Fredericton, New Brunswick, Canada, Jan. 19.

Bruce L. McClennan, M.D., was a workshop panelist on "Renal CT" for the IXth International Congress of Nephrology in Los Angeles, June 16.

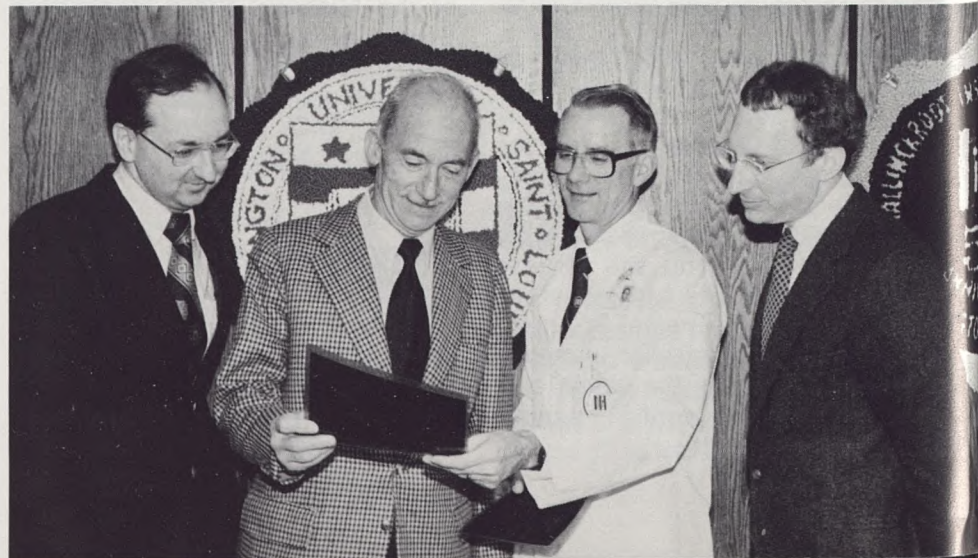
Organizes ACR Seminar

Ronald G. Evens, M.D., chairman of the Committee on Practice Management in the American College of Radiology (ACR), organized a seminar covering the management aspects of diagnostic and therapeutic radiology practice with special emphasis on DRGs and TEFRA. The CME-accredited course was held Feb. 9-10 in Las Vegas, Nevada. As a member of the ACR faculty, Dr. Evens presented "Financial and Cost Accounting for Radiology" and "The Hospital Budget with Particular Emphasis on the Department of Radiology." He also moderated a special seminar on "Prospective Payment Policies" and conducted a workshop on "Finances, Accounting, and Billing."

Consultant

Mokhtar H. Gado, M.D., was a consultant to the Advisory Committee on Clinical Application of NMR for the Ministry of Health in Canada which convened in Toronto, Canada, Feb. 2.

On March 2, 1984, Dr. Ronald G. Evens welcomed Dr. Paul Tessier of Paris, France, the father of craniofacial surgery, to Mallinckrodt. Dr. Tessier visited St. Louis to study the three-dimensional CT reconstruction methods developed by Drs. Michael W. Vannier, far left, and Jeffrey L. Marsh, far right.



UPDATE

Visiting Professors/ Guest Lecturers

Joseph K.T. Lee, M.D., spoke on "CT of the GI Tract" as visiting professor for the State University of New York at Buffalo, Jan. 9-10, and on "NMR of the Body" for the Buffalo Radiological Society on Jan. 9.

William H. McAlister, M.D., served as visiting professor at Cleveland Clinic and Case Western Reserve, February 28-March 1.

Jay P. Heiken, M.D., presented "CT of Pelvic Neoplasms," "The Use of CT in the Evaluation of Patients Following Radical Pancreatectomy," and "Differentiation of Complicated Cholecystitis from Gallbladder Carcinoma by CT" as visiting professor at Columbia University in New York, Feb. 29.

Gilbert H. Nussbaum, Ph.D., presented a lecture on "Hyperthermia" to S.H.A.R.E. (breast cancer support group) in Rand Johnson at Barnes Hospital, March 22.

Bruce L. McClennan, M.D., was visiting professor at the University of Alabama, Birmingham, Alabama, April 18-20.

Mokhtar H. Gado, M.D., was a visiting professor at the Calgary General Hospital in Calgary, Alberta, Canada, May 8-10 and at a meeting of the Middle Tennessee Radiological Society, Vanderbilt University, Nashville, Tennessee, May 14.

Todd H. Wasserman, M.D., presented a paper recently on "The Clinical and Neuropathological Changes of Peripheral Neuropathy from Radiosensitizers" at the Fourth International Conference on Chemical Modifiers held in Banff, Alberta, Canada. He edited the proceedings of the meeting and was elected to serve on the organizing and program committee for the next meeting to be held in approximately two years in the southeast United States.

Conferences/ Symposia/Meetings/ Seminars/Courses

Todd H. Wasserman, M.D., presented "Late Effects of Radiation" for the Fixman Cancer Conference in St. Louis, Dec. 19, 1983, and attended the Semi-Annual Radiation Therapy Oncology Group meeting in Philadelphia in January. Dr. Wasserman also presented "New Developments in Radiation Oncology" for the St. Louis Medical Oncology Society on Feb. 9, and for the Regional Meeting of Bi-State Tumor Registrars in St. Louis, Feb. 23.

Harvey S. Glazer, M.D., presented "CT of the Neck," "CT of the Mediastinum," "CT of the Biliary Tract," and "CT of the Retroperitoneum" for the American College of Radiology Symposium on Computed Body Tomography in Washington, D.C., Jan. 20-22.

Mokhtar H. Gado, M.D., attended conferences and made the following presentations: "The Spine" for the Symposium on Computed Body Tomography (ACR), Washington, D.C., Jan. 22.; "Proton NMR in Stroke" for the Princeton-Williamsburg Conference on Cerebrovascular Disease, Williamsburg, Virginia, March 11-13; "Radiology of C.V.A. (Cerebrovascular Accident), Part I," "Radiology of C.V.A., Part II," and "Radiology of Spinal Stenosis" for the 1984 Neuro-radiology Review Course sponsored by Loyola University, Oak Brook, Illinois, May 5-6; "Lumbar Disc Disease and Spinal Stenosis," "CT of the Paranasal Sinuses and Facial Structures," and "NMR of Brain and Spine" for the Pacific Northwest Radiological Society Meeting, Victoria, British Columbia, Canada, May 11-13.

Joseph K.T. Lee, M.D., made four presentations and participated in three workshops for the Society of Computed Body Tomography (CBT) Postgraduate Course in Grenelefe, Florida, Feb. 19-24.

Carlos A. Perez, M.D., attended conferences and made the following presentations: "Clinical Hyperthermia: Indications, Contraindications and Treatment Techniques," "Combined Mode Cancer Therapy and Adjuvant Therapy," "Carcinoma of the Prostate—Diagnostic and Therapeutic Radiologist Perspectives," "Management of Carcinoma of the Oropharynx," and "Should Hyperthermia Be Used Today in the Community Hospital Practice?" for the 36th Midwinter Oncology Conference of the Los Angeles Radiological Society, Los Angeles, California, Jan. 27-29. At the Post Conference Seminar of the Los Angeles Radiological Society, Los Angeles, California, Jan. 29-Feb. 4, "Treatment of Carcinoma of the Prostate," "Radiotherapy for Non Small Cell Carcinoma of the Bronchus," "The Use of Hyperthermia in Clinical Practice," "Multimodality Treatment for Carcinoma of the Rectum: Indications and Results," and "Treatment Planning for High Energy Photons and Electrons." At a meeting of the Medical Society of the National Cancer Institute of Mexico in Mexico City, Feb. 16-18, "Radiotherapy in Carcinoma of the Uterine Cervix," "Radiotherapy in Carcinoma of the Breast," and "Carcinoma of the Larynx."

William A. Murphy, M.D., presented "Magnetic Resonance of Muscular Pathology" for the Seventh CARVAT: New Imaging in Radiology, Rome, Italy Feb. 8.

Daniel R. Biello, M.D., presented "An Evaluation of Lung Disease with Radionuclides" for the California Medical Association Annual Scientific Session, Anaheim, California, Feb. 12. Dr. Biello was also a discussant for a workshop on "The Diagnosis of Venous Thrombosis" sponsored by the National Institutes of Health, Bethesda, Maryland, Feb. 27-28.

Patrick R.M. Thomas, M.D., spoke on "Gastrointestinal Tumor Study Group Rectal Trial" at the Royal Marsden Hospital, Feb. 21, in London, England.

Continued

NEWS UPDATE

Stuart S. Sagel, M.D., made the following presentations: "CT of the Mediastinum" for the 6th Annual Society of Computed Body Tomography Course, Grenelefe, Florida, Feb. 17-24; "CT of the Pericardium" and "CT of the Mediastinum" for the 1st Annual Society of Thoracic Radiology Course, Disneyworld, Florida, March 17-23; "Ten Talks on CT Topics" at the CT Symposium, Steamboat Springs, Colorado, March 24-31; and "CT of Adrenals," "Staging of Lymphoma," "The Mediastinum," "CT of the Larynx," "Pancreatic Malignancy," and "Liver Masses" for the Body CT Seminar in Sydney, Australia, June 7-12.

William Ganz, M.D., presented "Staging of Ischemic Necrosis by Scintigraphy and Magnetic Resonance Imaging" for a meeting of the Society for Magnetic Resonance Imaging in Grenelefe, Florida, Feb. 25-March 2.

Gilbert H. Nussbaum, Ph.D., presented "Quality Assessment and Assurance in Clinical Hyperthermia: Requirements and Procedures" for the American Cancer Society Workshop on Hyperthermia in Cancer Therapy, Tucson, Arizona, March 19-21. For the Annual Meeting of the North American Hyperthermia Group and Radiation Research Society in Orlando, Florida, March 23-27, Dr. Nussbaum presented a paper, "Multiple-Antenna Applicators for Microwave-Induced Local Hyperthermia."

Patrick R.M. Thomas, M.D., presented "Factors Associated with Abdominal Relapses in Irradiated Second National Wilms' Tumor (NWTS-2) Study Patients" for a meeting of the American Radium Society (ARS), San Diego, California, March 21.

G. Leland Melson, M.D., presented "Imaging Evaluation of Renal Infections" and "Ultrasound Artifacts" for the Spring Sonic Symposium, sponsored by the Mississippi Ultrasound Society, held in Jackson, March 31.

Bruce L. McClennan, M.D., presented "Percutaneous Nephrostomy,"

"Oncologic Imaging of the Female Reproductive System," and "Oncologic Imaging of Pelvic and Ureteric Cancer," and "Oncologic Imaging of Bladder and Prostate Cancer" for the Aspen Uroradiologic Conference, Aspen, Colorado, March 4-8. For the Davos International Course in Davos, Switzerland, April 1-8, Dr. McClennan spoke on "Urography" and served as a member of the international expert film panel.

Michael W. Vannier, M.D., spoke on "Surgical Graphics" at Computer Graphics '84, the largest U.S. conference and exposition devoted exclusively to computer graphics applications. It was held May 13-17 at Anaheim Convention Center, Anaheim, California. Dr. Vannier was also an invited speaker for the first Image Symposium, held May 21-25, in Biarritz, France and organized by CESTA (Center for the Study of Advanced Technologies). For the Association of Hospital Radiology Administrators' (Ahra) Southwest Region Annual Conference, May 16-18 in St. Louis, Dr. Vannier presented "Computer Graphics for Maxillo-Facial Reconstruction." Drs. Vannier and Jeffrey Marsh made presentations on "3-Dimensional CT Scan Reconstruction" at the international meeting on computer-aided design applied to medicine sponsored by the Department of Commerce and Development and the New Brunswick Technology Centre held Jan. 19 in Fredericton, New Brunswick, Canada. The meeting was attended by physicians and government officials from eastern Canada. McDonnell Douglas has installed over 20 computer-aided design systems in New Brunswick for use in education, manufacturing, and research.

del Regato Lecture

One of the world's most respected medical biophysicists delivered the eighth annual del Regato Lecture, May 17, at Mallinckrodt Institute of Radiology.

John Francis Fowler, M.D., discussed current work concerning the

effects of radiation on cancer in the lecture hosted by the institute's division of radiation oncology.

Dr. Fowler, highly regarded for his research in the area of cellular response and tissue kinetics, has been director of the Gray Laboratory of the Cancer Research Campaign in Middlesex, England, since 1969. He is a member of the board of editors for several scientific journals and has served as president of three European radiological societies. His many honors include the prestigious Roentgen Prize of the British Institute of Radiology as well as the Roentgen Plaque from Remscheid, Germany.

The del Regato lecture, delivered annually since 1977 by a leader in the field of oncology, and hosted each year by a different institution, is sponsored by the Juan A. del Regato Foundation. The foundation was established in 1974 by the colleagues and friends of the physician for whom the foundation and lecture are named.

Dr. del Regato, currently professor of radiology at the University of Florida and Veterans Administration Distinguished Physician, is the recipient of the gold medals, the highest awards of the Radiological Society of North America (RSNA), the Inter-American College of Radiology, and the American College of Radiology. He was present for Dr. Fowler's lecture.

Jewish Hospital radiation oncology department receives gift from Auxiliary

Todd H. Wasserman, M.D., chief of the department of radiation oncology at Jewish Hospital, announces a gift of \$35,000 earmarked for additional treatment equipment recently presented by the Jewish Hospital Auxiliary. This gift will allow the purchase of a new treatment couch, new equipment for internal radiation of gynecology patients, and a new superficial machine to treat skin cancers. A joint project of Mallinckrodt Institute of Radiology and Jewish Hospital, the radiation oncology department was dedicated on December 6, 1983.

Dr. Vannier Receives Lindbergh Award

Michael W. Vannier, M.D., assistant professor of radiology at Mallinckrodt Institute and former consulting engineer for NASA, received the 1984 Lindbergh Award from the Honors and Awards Committee of the St. Louis Section of the American Institute of Aeronautics and Astronautics (AIAA). Presented annually in recognition of a distinguished application of aerospace technology toward improving the quality of human life, the Lindbergh Award was conferred on Dr. Vannier during the AIAA awards dinner May 23.

Recognized for his leadership in aerospace computer-aided-design (CAD) technology applied to surgical planning for reconstruction of craniofacial deformities, Dr. Vannier's role in the cooperative program between Mallinckrodt Institute and McDonnell Douglas has led to the most accurate computer visualization ever created of the skull of a living human being. Surgeons can now actually simulate surgical procedures on a three-dimensional replica of the patient's face and head. This computerized production of "blueprints" for the correction of complex skull abnormalities, coupled with the construction of solid models, has offered significant developments for both reconstructive surgery and reparation of birth defects.

As the primary society for aeronautical and aerospace engineers, the AIAA includes among its membership representatives from McDonnell Douglas, General Dynamics, Washington University, the U.S. Army, the U.S. Air Force, and Missouri University. Raymond Firehock of the Arms Control and Disarmament Agency, Washington, D.C., spoke at the awards dinner on "Verification Aspects and Modern Arms Control and Disarmament."

Distinguished Eagle Scout Award to Dr. Evens



Ronald G. Evens, M.D., receives the Distinguished Eagle Scout Award from Dr. William H. Danforth, chancellor of Washington University, former congressman Thomas B. Curtis, center, and Scout executive Robert F. Meinholtz, right.

Ronald G. Evens, M.D., Elizabeth Mallinckrodt professor and director of Mallinckrodt Institute of Radiology, has received the Distinguished Eagle Scout Award from the National Council, Boy Scouts of America. The award honors individuals who have held the Eagle Scout rank, scouting's highest honor, for 25 years or more, and have distinguished themselves in their career or in public life.

The award was presented by Dr. William H. Danforth, chancellor of Washington University, former Missouri congressman Thomas B. Curtis, and Scout executive Robert F. Meinholtz at the March 12th meeting of the City Wide Radiology Conference at Mallinckrodt. Evens is the thirteenth St. Louis civic leader to receive the award since it was established in 1969.

Dr. Evens earned the rank of Eagle Scout at age 13 and was Chief of the Order of the Arrow Lodge (a society of honor campers) for the entire St. Louis area in 1958. He has served scouting in many positions, including camp physician, lodge advisor (1974-1982), National Jamboree planning committee, and is currently responsible for the medical division of the St. Louis Area Council capital fund drive.

"I owe a great deal to scouting," says Dr. Evens, a native of Hannibal, Missouri. "It taught me many things, enabled me to travel to world and national Jamborees, and two men in the scout office in St. Louis, Russ Hart and Mel Loewenstein, were very helpful in my making the transition from small town to big city."

More than 35,000 youth members and 12,000 adult volunteers of the Boy Scouts live in St. Louis.





Volunteers Sally Hermann and Bill Farrelly stock shelves in the new Cancer Information Center located on the first floor of Barnard.

New Home New Coordinator



Lois J. Howland, R.N., new professional coordinator of CIC.

The seven-year-old Cancer Information Center (CIC), started by Malinckrodt Institute's division of radiation oncology and the Barnard Free Skin and Cancer Hospital in July 1977, has a new home and a new coordinator.

Initially located in small and rather austere quarters, the CIC now features windowed walls, contoured desk and counters, and an aqua color scheme. Located adjacent to its original site in the first floor Barnard Corridor, the center provides a more comfortable environment for its visitors and has a greater capacity for literature and other materials.

The new facility was necessary because the CIC had expanded considerably since its creation and was serving more than twice the number of visitors each year than it had seven years ago. Last year, there were more than 4,000 visitors. The number now averages over 800 a month.

For the first time in its history, the

Cancer Information Center has a professional coordinator, **Lois J. Howland**. Prior to her appointment in early May, the center was completely staffed and operated by Barnes Hospital volunteers, and directed by volunteer, Mrs. Sally Hermann.

Mrs. Howland, a registered nurse, graduated from Columbia University, New York, and received her bachelor of science degree (BSN) from the Columbia Presbyterian Hospital School of Nursing. She brings a broad range of experience in dealing with terminally ill patients and their families.

As supervisor of a 250-bed skilled nursing facility in Ithaca, New York (directing a 35-member staff), staff nurse in the Visiting Nurse Association, and head nurse at a private psychiatric hospital, she has helped hundreds of patients with long-term illnesses find resources to cope with the physical as well as emotional process.

Mrs. Howland is married and the

AFSL Gridiron Proceeds for Hyperthermia

A \$20,000 contribution was awarded the Mallinckrodt Hyperthermia Research and Treatment Center at Barnard Free Skin and Cancer Hospital by the Advertising Federation of St. Louis (AFSL). Presented by **Virginia Trent**, AFSL president, the donation represents this year's proceeds from the gala 50th Anniversary Gridiron dinner and show held March 23.

Recognizing the importance of the more than \$500,000 donated by the Advertising Federation, **Ronald G. Evens, M.D.**, director of Mallinckrodt Institute, noted, "with government grants for research being cut back annually, the importance of the group is continually increasing. We've been able to use the AFSL donations as seed money to bring in over \$1 million in matching funds." The Advertising Federation of St. Louis is a professional organization of men and women in advertising, public relations, and communications.



Left to right, Aline Surmeyer, 1984 Gridiron chairman; Carlos A. Perez, M.D., director of the Hyperthermia Research and Treatment Center; Mrs. Wendell G. Scott, member of Barnard Hospital board of directors; and Virginia Trent, AFSL president.

mother of four sons: 15-year-old twins, Thomas and David; James, a freshman at Stanford University; and Robert, a Vassar College senior. Her husband, Dr. Donald G. Howland, is the minister of The Ladue Chapel in St. Louis County. During her husband's ten-year ministry in New Jersey, Mrs. Howland's medical background helped serve patients within the congregation who were coping with life-threatening situations such as cancer, stroke, and severe burns. She identified patient needs and coordinated volunteer support groups to help in meeting those needs.

As CIC's director, Mrs. Howland will oversee the center's activities, including preparing and distributing cancer-related information to cancer patients and their families, providing physician referral resources, and recruiting and training the staff of nearly 20 volunteers.

Originally started by **Dr. Carlos Perez**, director of Mallinckrodt's di-

vision of radiation oncology, the CIC was the first such center in the United States. Since 1977, the center has inspired and served as the model for similar centers in several other places, including hospitals elsewhere in Missouri, Kentucky, Arkansas, and Rio de Janeiro, Brazil.

The CIC provides information on the types of cancer and its treatment to patients and their families. In addition, it provides materials on such subjects as smoking and the early detection of the disease in order to stress that the individual has the ability to care for his or her own body, and has, to a certain degree, the opportunity to prevent cancer or at least to minimize its risks. The center also has free wigs available for needy cancer patients who have suffered hair loss as a result of their therapy.

Equally as important is the psychological support that the CIC gives to patients and their families. Together with the films, videotapes, and book-

lets designed to help people cope with the disease and its tragedy, the center also offers something more.

Many of the CIC's volunteers have been touched directly by cancer, either as patients themselves or as relatives of cancer patients. Not only do these volunteers have first-hand knowledge of a cancer patient's problems, but they also show, in the most cogent of all ways, that life can go on quite normally after cancer therapy. These volunteers also work within the St. Louis community by leading and participating in meetings of cancer support groups such as "I Can Cope" and S.H.A.R.E. They also helped organize another support group, "Partners of Women with Breast Cancer."

The Cancer Information Center is open from 9 a.m. until 4 p.m. on Monday through Saturday. For more information, call 362-7844.

From the



Armand Diaz,
R.T., R.N., FASRT

Technical Administrator...

SART—Learning by Computer

A new continuing education program for technologists, one that uses computers for individual instruction and testing, has been developed at Mallinckrodt Institute. Called SART (Self Assessment in Radiologic Technology), the program is under the direction of **Mr. Armand Diaz, R.N., R.T., FASRT**; the educational material was developed by **Mary Kimberlin, RTBA**, program director, MIR School of Radiologic Technology.

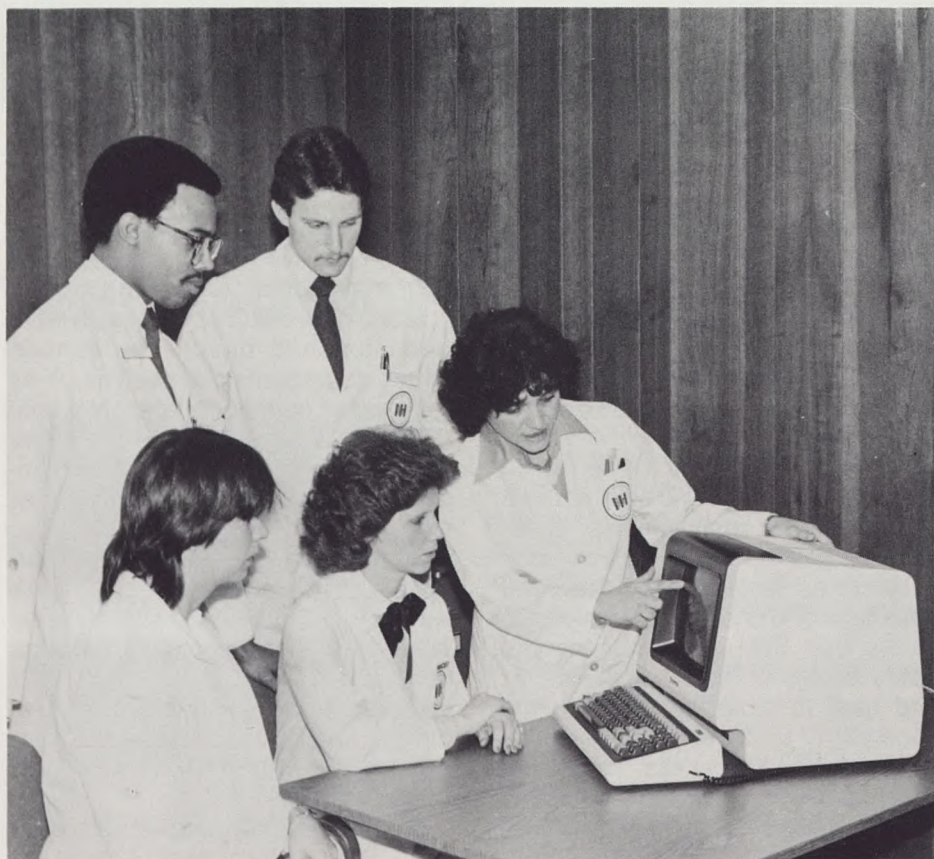
"Students who embark on their clinical and academic training will find far more sophistication, in many ways, than their predecessors of even five years ago. These rapid changes in the field of technology over the past (few years) have, indeed, imposed additional responsibilities to the educator," Ms. Kimberlin said. "This program recognizes the challenges of such change and encompasses a multitude of teach-

ing, testing, and learning experiences."

Steve Rodewald, of the MIR diagnostic computer section, provided major support by developing the basic mechanics of the program which covers a variety of subjects, including anatomy and physiology, physics, medical terminology, radiographic exposure and protection, MR, and others. Structured as a series of quizzes, consisting either of multiple choice or true-and-false questions, it provides for instantaneous evaluation of a student's progress. One particularly valuable feature of SART is that, if a student answers a question incorrectly, the computer will explain the correct response providing a learning experience for the student.

Because the instruction and testing is done by computer, SART has a flexibility that is not often found in a more traditional, instructor-led educational program. Students may participate according to their own, often busy, schedules. They can finish as much of a particular exercise as they have time for and sign out. "The next time they have a minute, they can come back to the computer and pick up exactly where they left off," Ms. Kimberlin said.

As far as the philosophy that led to SART, Ms. Kimberlin said, "Today's environment requires greater pace in advancing our skills. We must be committed to improving our standards of education by offering provisions such as SART that will allow opportunities to all individuals to reach their personal potential and to improve their quality of patient care practices."



Mary Kimberlin, RTBA, explains the computerized program for individualized instruction and testing to MIR clinical instructors.

MIR Alumna combines teaching and technology



Connie Huesgen, BSRT, uses a phantom human head to test new technological procedures.

Not everyone is fortunate enough to combine two career interests into a single job, but MIR alumna **Connie Huesgen** is one of those rare individuals. An A.A.R.T. registered technologist as well as a Missouri state certified teacher, she has joined her two vocations—teaching and radiology—in her position as education coordinator of the School of Radiologic Technology at St. John's Regional Health Center in Springfield, Missouri.

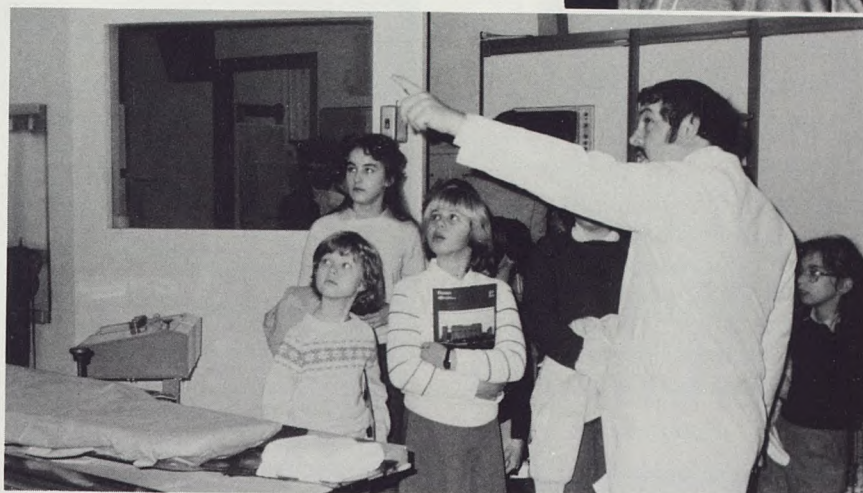
Ms. Huesgen, a Springfield, Missouri native, received her bachelor of science in education degree from Southwest Missouri State College in 1972. Her interest in radiology—one piqued when she volunteered during high school in the radiology department at St. John's—led her to attend MIR's School of Radiologic Technology. After completing her training in 1976, she worked as a staff technologist at MIR until 1978, when she was first given an opportunity to use her teaching skills as a clinical instructor.

In 1980, Ms. Huesgen joined the staff at St. John's where she is responsible for instructing more than half of the school's classes as well as administering financial aid. There are presently 29 students in the school, currently celebrating its thirtieth anniversary.



Gifted Students tour MIR

"Stretch" students (gifted 9-12 year olds) from the Mehlville School District are given an overview of MIR's advanced technology by technical supervisor Mike Albertina, R.T.



Washington University Alumni Tour MIR

On the evening of April 4, over fifty Washington University alumni visited Mallinckrodt Institute for the first in a series of alumni lectures. Planned to keep alumni and friends informed of current research at the School of Medicine, the evening was coordinated by Ms. Julie Kohn, of the Alumni office, and MIR public relations. At 7:30 p.m., guests assembled in Scarpellino Auditorium where **Dr. Ronald G. Evens** gave an "Overview of Radiology." The audience was then divided into three groups for a tour of the institute followed by coffee and dessert and informal questions. The tour provided guests with an opportunity to visit areas "on the cutting edge of technology": Magnetic Resonance, PET, CT, and 3-Dimensional Imaging. Assisting with the presentations were: **Drs. Michel Ter-Pogossian, Michael Vannier, and William Murphy**; technical administrator **Armand Diaz**; and R.T.s **Mike Albertina and Robert Knapp**.



Teaching Health By Example

Ever since the age of Hippocrates, physicians have been preaching to their patients the gospel of good health through physical fitness. They say, in general, fit people live longer, have less illness, have more energy, and—in many cases—are happier than those who are not physically fit.

Many Mallinckrodt physicians are enthusiastic proponents for the fitness doctrine. They believe exercise is not an end in itself, but a means for a person to feel better emotionally, mentally, and physically. Four among them competed last December in the St. Louis Marathon: **Drs. Ronald Evens, Gary Shackelford, Evan Unger, and Kenneth Rholl.**

It was the first for Dr. Evens. He covered the slightly more than 26-mile course through the city in 3 hours, 15 minutes—a pace of less than seven and a half minutes per mile. (This time beat that of the gold medal winner in the 1904 St. Louis Olympic Marathon who finished in 3 hours, 23 minutes).

Dr. James Blakely (MIR, '77), of Dallas, writes, "While in Chicago for RSNA, I observed how hard Dr. Evens was training for this event. I would run with him for half an hour and then he would continue running by himself for another hour. It was all I could do to stay up with him for this short

time that I ran with him."

The marathon was not an easy one. Falling snow and a 34-degree temperature contributed to the challenge. "When you consider the hills on this course and the time of year this race is run, I'd say this is one of the toughest marathons," said Dan Sebben, vice president of the St. Louis Track Club, to a St. Louis Globe-Democrat reporter.

Dr. Unger, a veteran competitive runner (two Ironman Triathlons and two marathons), completed the 26 miles in 2 hours, 53 minutes, 16 seconds. Dr. Shackelford finished the race—his 11th marathon—in 2 hours, 55 minutes, 9 seconds. Having previously completed four marathons, Dr. Rholl had a streak of bad luck, a lame leg, and was unable to finish his fifth race.

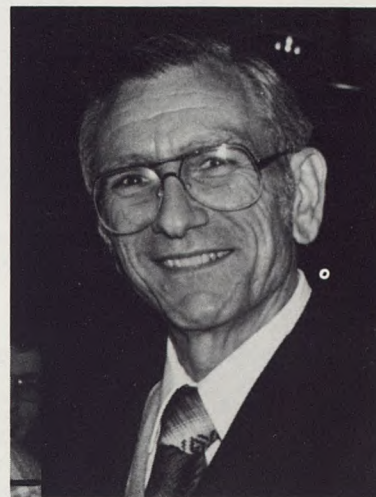
For these four physicians and others at MIR, running has become an integral part of their lives, providing not only regular exercise but also a time to unwind mentally, relax, and do some long-range planning.

"Competitive runs keep you interested and spirited," says Dr. Evens. "I would like to encourage everyone to take up running. Or if they can't run, they can walk—not a stroll, but at a Harry Truman pace."



MIR runners brave snow and 15 mph winds to run 12th Annual Third Olympiad Memorial Marathon. Pictured left to right are: Drs. Ronald G. Evens, Gary Shackelford, and Kenneth Rholl. Dr. Evan Unger also completed the 26-mile race.

IN MEMORIAM



Mark Brown, M.D. (1925-1983)

Everyone associated with the Mallinckrodt Institute of Radiology was deeply saddened by the death of **Mark Brown, M.D.** on November 19, 1983.

Dr. Brown, who was a resident in radiology at MIR from 1956-1959, had been professor of radiology at the Medical College of Georgia for twenty years until his death. Beginning in 1974, he was also medical director of the School of Nuclear Medicine Technology at the college. He was also chief of the section of nuclear medicine at the Eugene Talmadge Memorial Hospital in Augusta, Georgia. From 1963 until 1973, he served as chairman of the department of radiology at the Medical College of Georgia.

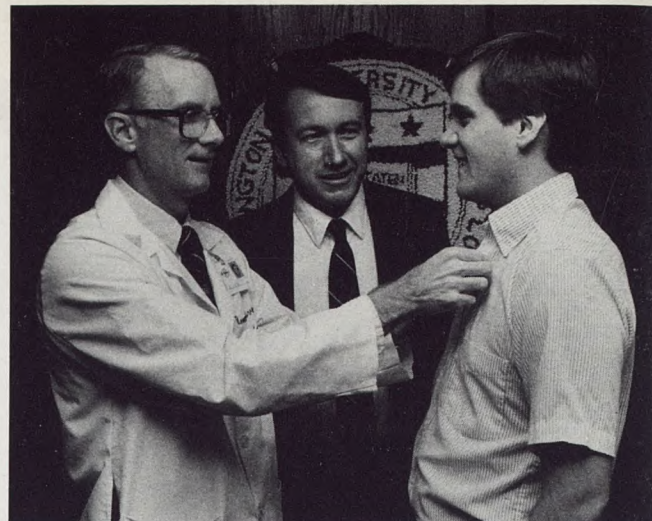
A fellow of the American College of Radiology and a member of the Society of Nuclear Medicine, the Association of University Radiologists, and other professional societies, Dr. Brown was the author of numerous articles published in medical journals.

His death at the age of 57 means a loss not only to his family and friends and all those associated with MIR, but also to the entire field of radiology.

He is survived by his wife, Julie Dudley (nee Hudson) Brown and three daughters.

Honor Graduate

Ronald G. Evens, M.D., places the Omicron Delta Kappa (ODK) pin on his son Ronald G. Evens, Jr., during his senior year at Washington University. A business major, Evens Jr. was initiated into the national leadership honorary which recognizes high achievement in scholarship, athletics, service, and government activities. His father was initiated into ODK in 1960 as an undergraduate student at the university. Peter H. Ruger (center), Washington University's general counsel and ODK's advisor, said the initiation marked the first father/son membership in the chapter's 50-year campus history.



MR Lecturer

Charles Higgins, M.D., professor of radiology at the University of California at San Francisco, lectured on "MRI of the Cardiovascular System" for MIR's noon conference and "MRI of the Body: General Principles and Clinical Application" for the City-Wide Radiology Conference, both held on March 12. Pictured with Dr. Higgins are: Drs. Ronald G. Evens, left, and William A. Murphy, right.



MALLINCKRODT INSTITUTE OF RADIOLOGY

AT WASHINGTON UNIVERSITY MEDICAL CENTER

Published quarterly by the Public Relations Department for staff, students, and friends of Mallinckrodt Institute of Radiology, 510 South Kingshighway, St. Louis, Mo. 63110.

FOCAL MAGAZINE

Virginia Trent
Director and Editor
Ria Munoz
Editorial Assistant
Norman Hente
Tom Murry
Photographers

Return Address
Public Relations Department
Mallinckrodt Institute of Radiology
510 South Kingshighway
St. Louis, Missouri 63110

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